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COST OF UNDERGRADUATE MEDICAL INSTRUCTION IN AN ENDOWED SCHOOL

Gerhard C. Henricksen, C.P.A.
and
Wilburt C. Davison, M.D., Durham, N. C.

Stimulated by the analysis of the cost of undergraduate medical education in state-supported schools by President Wells of Indiana,[1] and his challenge that endowed medical schools also should publish their costs and not hide their budgets from the public, we have attempted this task for Duke University School of Medicine and Duke Hospital. A study of the costs of undergraduate medical education is especially important at the present time, since not only is a cooperative survey of medical schools being conducted by the Council on Medical Education and Hospitals of the American Medical Association and the Association of American Medical Colleges but also the possibility of federal financial assistance to medical education would require an accounting of present expenditures. Furthermore, all the schools, both state and privately endowed, are in financial straits.[2]

A third reason for compiling these figures is that the medical schools have a responsibility to keep the costs of undergraduate medical education fair and reasonable and either to justify the present expenditures or to reduce them. We quote President Hancher of Iowa: "All reasonable men wish the quality of medical education to be maintained at the highest level, and that the schools of medicine should have every dollar necessary to maintain medical education at that level, but not all reasonable men are convinced that the costs of medical education need be as high as they are. . . . Is the high cost of medical education necessary, and can it be proved?" [3]

Fourth, an analysis of costs is necessary in order to study the possibility of "more economies in medical schools" and of the "financing of hospital care and other community services," as suggested by the Commission on Financing Higher Education.[4]

To obtain the cost of medical education at state-supported schools, President Wells used the formula of the net amount contributed by the university, i. e., subtracting from the total expenditures of the school and hospital all collections from patients and all other sources, except those from medical students. As the tuition fees went into the general fund, they were not subtracted from the total costs. On the basis of that formula, the annual net total costs of the medical schools at state universities varied from $200,000 to $1,100,000, with a mean of $600,000. Tuition at the state schools averaged 15% of the costs.[1]

That method of calculation is easy, because every university treasurer knows at the end of the year to his sorrow, and sometimes unexpectedly, the exact amount of the annual expenditures of the medical school and its teaching hospital. On that basis, the annual net total costs to the university can be obtained by subtracting the receipts from outside teaching and research grants, collections from patients, gifts from foundations, and the like (table 1). The annual net cost per undergraduate medical student is then calculated by dividing the above remainder by the number of undergraduate medical students enrolled in that year (table 2). However, Dietrick has emphasized [5] that the results obtained by this formula do not represent the true "basic operating expense" of medical education [6] and are misleading and meaningless. As will be pointed out later, these cost figures include many services to the public, some research

From the Department of Pediatrics, Duke University School of Medicine and Duke Hospital (Dr. Davison).

1. Wells, H. B.: State Funds in Support of Medical Education, J. A. Am. M. Coll. **22**: 155-159 (May) 1947.
2. Valentine, A.: The Privately Endowed Medical Schools; Their Present and Future Financing, J. A. M. A. **137**: 1-5 (May 1) 1948. Brown, M. C.: Medical School Financing in Theory and Practice, South. M. J. **42**: 793-801 (Sept.) 1949. Rusk, H. A.: Lack of Funds Threatening Medical Education of Nation, New York Times, May 27, 1951, p. 36.
3. Hancher, V. M.: The Social Responsibilities of Medicine, J. A. Am. M. Coll. **25**: 81-89 (March) 1950.
4. Financing Medical Education, New York, Commission on Financing Higher Education, May, 1951.
5. Deitrick, J. E.: Reporting for the Survey of Medical Education, Meeting of Association of American Medical Colleges, Lake Placid, N. Y., Oct. 24, 1950.
6. Surgeon General's Committee on Medical School Grants and Finances: Financial Status and Needs of Medical Schools, A Preliminary Report, Public Health Service, Federal Security Agency, 1950.

expenses, and the expense of the instruction of nonmedical students, which should not be charged to undergraduate medical education.

On the basis of the formula used by President Wells [1] and the Surgeon General's committee,[6] the annual net total costs at Duke have varied from $305,368 in 1933-1934 to $891,356 in 1946-1947 (table 2). Exclusive of the relatively higher expenses in 1930 when the school was opened, the annual net cost per undergraduate medical student, calculated on this erroneous basis, has ranged from $1,582 in 1933-1934 to $3,626 in 1947-1948 (table 2). The causes for this fluctuation will be discussed later. In 1947-1948, the tuition paid by the undergraduate medical students represented 18% of this figure, but in 1950-1951, owing to higher tuition and lower net total costs, it was 33%.

TABLE 1.—*Expenses and Revenue, 1947-1951, Duke University School of Medicine and Duke Hospital*

Item	1947-1948 (Actual)	1948-1949 (Actual)	1949-1950 (Actual)	1950-1951 (Actual)
Expenses: School of Medicine *	$ 728,460	$ 747,689	$ 732,231	$ 744,861
Expenses: Duke Hospital	2,202,165	2,387,078	2,449,507	2,777,668
Expenses: Total	2,930,625	3,134,767	3,181,738	3,522,529
Less: Collections from patients, outside teaching grants, etc.*	—2,078,541	—2,456,762	—2,678,608	—2,845,124
Annual net total cost *	852,084	678,005	503,130	677,405
(Annual net cost per undergraduate medical student) †	(3,626)	(2,439)	(1,784)	(2,192)
Subsidy from Duke University	700,284	467,505	283,380	453,905
Tuition paid by undergraduate medical students ‡	151,800	210,500	219,750	223,500

* Not including approximately $300,000, annually, in research expenses paid by additional outside grants. The tuition paid by the students has not been subtracted from these cost figures.

† The annual net total costs divided by the total number of undergraduate medical students (235 in 1947-1948, 278 in 1948-1949, and 282 in 1949-1950). The size of each entering class is 76. The small number of students in 1947 was due to the hiatus caused by return to the peacetime voluntary accelerated program from the wartime compulsory schedule. The differences in 1948 and 1949 are due to differences in the number enrolled in the voluntary accelerated summer quarter.

‡ Tuition at $200 per quarter, or $600 per academic year of three quarters, in 1947-1948, which was increased to $250 per quarter, or $750 per academic year of three quarters, in 1948.

The recently published estimate of medical teaching costs at another endowed school (table 3) shows a somewhat similar annual expense per undergraduate medical student ($3,339), on the basis of the hourly costs with the total net expenses charged to the undergraduate medical students.[7]

In the preliminary report of the Surgeon General's committee, covering the 72 four-year American medical schools, the median annual net total expense, after deduction of all income from patients was $509,970, with a range from $381,543 to $782,654.[6] The median figure obtained by dividing the annual net total expense by the total number of undergraduate medical students was $2,285, varying from less than $1,500 to over $3,500. The tuition paid by the undergraduate medical students was 23% of these expenses (median), with a median percentage of 17 in publicly supported schools and of 27 in endowed schools.

It is no wonder that "not all reasonable men are convinced that the costs of medical education need be as high as they are." [8] As a matter of fact, they are not as high as indicated by the figures in tables 1, 2 and 3. These amounts, accurate as they are, fail to tell the whole story, but university presidents [8] and medical deans [9] still believe that the median annual net cost of educating an undergraduate medical student is in the neighborhood of $2,500. University faculties and trustees and all other members of the tax-paying and endowment-contributing public should be told of the numerous services, in addition to medical education, that they are receiving from the funds that are erroneously charged totally to medical education.

There are at least six factors that should be considered before the cost of medical education can be understood or justified, or even reduced.

1. NEED FOR A UNIFORM ACCOUNTING PROCEDURE

The first factor is the great need for a uniform accounting procedure for medical schools and teaching hospitals. When the first Duke budget was set up, in 1930, the budgets of three other medical schools were studied, but only by repeated correspondence and interviews could any comparable figures be obtained. Although the results of that intensive study, as well as of this present one, show the amounts spent, they do not give a correct cost analysis, either comparatively with those of other institutions or for our own. For example, part of these costs, although they may be considered as integral and essential factors in teaching, should be

TABLE 2.—*Cost of Medical Education When All Annual Net Total Costs Are Charged Only to the Undergraduate Medical Students*

Year	Net Total Cost *	Total No. of Undergraduate Medical Students †	Annual Net Cost per Undergraduate Medical Student
1930-1931	$322,211	70	$4,605
1931-1932	403,119	144	2,799
1932-1933	388,442	165	2,354
1933-1934	305,368	193	1,582
1934-1935	434,950	210	2,071
1935-1936	471,511	217	2,173
1936-1937	472,744	241	1,962
1937-1938	512,005	244	2,098
1938-1939	610,478	256	2,385
1939-1940	646,307	259	2,495
1940-1941	662,035	262	2,527
1941-1942	603,544	262	2,304
1942-1943	519,110	266	1,951
1943-1944	500,102	302	1,656
1944-1945	621,155	296	2,098
1945-1946	766,233	282	2,717
1946-1947	891,356	290	3,074
1947-1948	852,084	235	3,626
1948-1949	678,005	278	2,439
1949-1950	503,130	282	1,784
1950-1951	677,405	309	2,192

* Over and above receipts from outside teaching and research grants, collections from patients, gifts from foundations, etc. The tuition paid by the students has not been subtracted from these cost figures. For calculations, see table 1.

† The fluctuations in the total number of undergraduate students are due to the differences in the number admitted each year (50 to 68 annually from 1930 to 1941, 76 every nine months during the war, and 76 annually thereafter), and to differences in the number enrolled in the voluntary accelerated summer quarter.

7. Medical Education in the U. S. A.: The Problem, The Cost, The Target, National Fund for Medical Education, Inc., 1950.

8. Wells.[1] Valentine.[2] Hancher.[3] Footnote 4.

9. Footnotes 6 and 7.

10. At other universities, this overhead has varied from 11.5% to 45%, with an average of 27%. (Weaver, H. M.: A Formula to Determine the Cost of Research, J. A. Am. M. Coll. **25**: 248-254 [July] 1950).

charged to the following research, instructional, and other services, and not solely to the teaching of undergraduate medical students.

(*a*) *Research.*—Although the outside research grants are not included in the costs in tables 1 and 2, the added expense of such items as material, structural and building changes, maintenance and upkeep, and ancillary personnel, has been calculated to be 38% of the salaries and wages,[10] or approximately 32% of the total expenditures. As most of the outside grants carry only 8% overhead on the total, the remaining 24% should properly be considered part of the institution's contribution to outside sponsored research and should be deducted from the net cost of medical instruction. In 1950-1951, for example, these outside research grants totaled more than $300,000 and this 24% amounted to over $72,000. It should be pointed out that, in addition, the medical school made other substantial contributions to this research program, in the way of supervisory personnel and even principal investigators, but the amount of this contribution is not as easily computed as the indirect costs. Furthermore, it is quite justifiable to deduct the entire 24%, because the university budget already includes funds for the "normal" research program that is essential to satisfactory medical education,[11] whereas this 24% applies only to that "extra" research that is of more value to medicine in general and to society than to medical education. In fact, in some schools, this "extra" research, instead of aiding medical education, actually interferes with it by keeping members of the senior faculty so busy that many of them have lost contact with the students.[12]

TABLE 3.—*An Estimate of Medical Teaching Costs (1947-1948) at Another Endowed Medical School, Based on Charging All of the Annual Net Total Costs to the Undergraduate Medical Students* *

Years Taught	Subject	Total Teaching Hours per Undergraduate Medical Student	Hourly Teaching Cost † per Undergraduate Medical Student	Total Teaching Cost † per Undergraduate Medical Student
1st	Anatomy	704	$1.73	$1,219
1st	Biochemistry	242	3.14	761
1st, 2nd	Bacteriology	154	3.90	601
1st, 2nd	Physiology	253	3.14	794
4 yr	Psychiatry	181	7.50	1,358
2 yr	Pathology	330	2.81	929
2nd, 3rd	Pharmacology	132	3.61	477
2nd, 3rd, 4th	Medicine	932	2.18	2,034
2nd, 3rd, 4th	Surgery	679	2.63	1,824
2nd, 3rd, 4th	Obst. & Gynec.	530	2.60	1,382
2nd, 3rd, 4th	Pediatrics	246	4.41	1,085
2nd, 3rd	Public Health	176	3.67	646
2nd	Radiology	11‡	2.36	246
		4,570	$3.14§	$13,356‖

* Medical Education in the U. S. A.[7]

† Actual expenditures for all professional and nonprofessional salaries, supplies, and administrative and maintenance expenses. Hospital and intern and resident costs or outside research grants are not included. The tuition paid by the undergraduate medical students, which represents 21% of the costs, was not subtracted from the total cost.

‡ Additional hours included in other subjects.

§ Mean.

‖ Total per undergraduate student for the four-year course; $3,339 annually per student.

(*b*) *Hospital Charity Costs.*—The hospital charity costs, that is the difference between the cost of hospital care and the amount the patients pay, which usually exceeds $100,000 annually at Duke,[13] should be deducted from the university subsidy and charged to the community whose patients have been benefited by the medical care. Despite a popular belief to the contrary, the cost of operating a teaching hospital is no more than that of any other good hospital. For example, last year's daily patient cost at Duke Hospital of $14.20 was exceeded by some nonteaching hospitals in the state. Local communities pay in full the difference between costs and collections in nonteaching hospitals, and there is no reason why they should not do likewise for a university teaching hospital. Furthermore, an intern's maintenance and a resident's salary are hospital expenses and should not be charged to medical education.

(*c*) *Professional Services to the Indigent.*—Professional service to the indigent is one of the greatest benefits to the public from the funds that they mistakenly believe are entirely spent for medical education. If a small charge for the highly skilled medical, surgical, obstetric, and pediatric care of the patients who cannot pay for these professional services were paid by the community and deducted from the university subsidy to medical education, the annual net costs would be greatly reduced. For example, in an average year at Duke, the community should reimburse the university for the examination of each of the 95,000 annual outpatients and the 8,000 inpatients and for the daily professional treatment of these public ward (not private) patients, who spend 90,000 patient-days in the hospital.

If we use the year 1948-1949 as an average year and reduce the net total cost of $678,005 (tables 1 and 2) by $72,000, which is chargeable to research, and by $18,945 (the hospital operating deficit for that year),[14] which is chargeable to charity, we have an adjusted cost figure of $587,060, which would represent the true net cost of medical education.

(*d*) *Distribution of the Net Costs to Teaching of Ancillary Personnel.*—Distribution of the net cost to the teaching of ancillary personnel, an important contribution that Deitrick has made to this problem,[5] emphasizes the need for a uniform accounting for medical schools. For example, in 1948-1949, the $587,060, which was the true net annual cost of medical instruction (see preceding paragraph), should be distributed not only to the education of the 278 undergraduate medical students but also to the training of the 141 student nurses, 12 dietetic interns, 58 students in ancillary medical fields (6 in anesthesiology, 11 in physical therapy, 5 in medical record science, 3 in laboratory technology, and 5 in x-ray therapy), and 229 interns, hospital administrative students,

11. Obviously research is necessary for good medical education in order to stimulate the staff and students (Davison, W. C.: The Future of Medical Education, J. A. Am. M. Coll. **21**: 223-235 [July] 1946), but some accounting yardstick is necessary to determine the optimal or "normal" amount per student or faculty member, which should be provided by university funds. Some years ago, Dr. Lewis H. Weed and one of us tried to calculate the percentage of the Johns Hopkins budget used for this "normal" research and "guessed" that it was between one-third and one-half of the total. The situation at Duke is similar, so we therefore assumed that the funds in the present university budgets (table 1) at least represent the minimal amount of research support needed for good teaching and that the unpaid portion of the overhead for the "extra" outside research funds should not be charged to medical education.

12. Davison, W. C.: Returning the Faculty to the Students, to be published.

13. The annual net deficit of Duke Hospital has been as high as $302,531.

14. This abnormally low operating deficit was due to unexpectedly better collections from patients, insurance carriers, welfare agencies, and the like, and lower expenses owing to inability to find the nurses, technicians and other employees who had been included in the budget.

residents, and fellows,[15] who are just as truly graduate students as those in academic graduate schools. These 440 nursing, dietetic, technical, and graduate students, in addition to the 278 undergraduate students, make a grand total of 718. All of these 718 students, not to mention the hundred or more physicians who attend the Duke five-day semiannual postgraduate refresher courses, are taught by the same faculty and with the same equipment and budget, so that it is logical to divide the annual net total costs, not by the 278 undergraduate medical students, but by 718, the total of all who were receiving medical, nursing, dietetic, and technical instruction. It might be argued that these 440 residents, fellows, and nursing and technical students should not be given the same weight in the calculations as the undergraduate medical students, on the ground that the undergraduate medical students pay more tuition than the others and therefore are given more instruction, an accusation that is far from true. No one would deny that the cost of instruction should be distributed over all students who are being taught by the medical school faculty, but, as we point out later in discussing the variations in the hourly teaching cost per instructor and per department of the medical school, it is impossible to give the same weight to the teaching costs in any department in any year. At times, the instructional costs for nurses and technicians, even after giving credit for the service they render, is actually higher than that for medical students, while at other times of the year, especially while the medical students are on vacation, this teaching might be considered a by-product. In addition, the same quality of equipment is necessary in order that students may be taught to use it as well as to take care of it. However, we realize that there is almost as much danger of error and misleading conclusions in giving the same weight to all students as in failure to distribute teaching costs to all of the ancillary student personnel. Again, the need of a standard accounting procedure is emphasized.

Comment.—On this logical basis of dividing the true annual net cost of $587,060 by 718 students, the annual net expense per student in 1948-1949 would be $817.63 instead of the $2,439 based on charging all of the annual net costs only to the 278 undergraduate medical students. It might be argued that, by including these 440 residents, fellows, and nursing and technical students in the denominator, we should also increase the net total cost by the tuition paid for these groups. In the average year under consideration, such payments amounted to $98,080; the cost would then be $685,140 and the net annual cost per student $954.23. If these calculations were based on the lower subsidy in 1949-1950, the net annual cost per student would be $600.46 and $705.48, respectively. These amounts could be reduced still further by more efficient and continuous use of laboratories and classrooms in an accelerated program of three years of 11 months each.[16] However, when the figures as they stand are used, it becomes apparent that the undergraduate medical student is sharing jointly with the university the expense of community services for which the public should reimburse the university.

Of course, the joker in this analysis is that the community does not pay its share, so that the higher expenses as shown in tables 1, 2, and 3 are considered to be the cost of undergraduate medical education. By showing "who should pay what," we hope that an enlightened public may recognize and pay for these community benefits and not continue to force the university to carry expenses that are not educational. The public needs to be informed of the services being provided over and above medical education by their institutions, and for this purpose the analysis of the distribution of costs that we have just given should be used instead of the usual formula for determining the expense of medical instruction.

2. AIM OF THE SCHOOL

The second factor to be considered in the cost of medical instruction is the aim of the school, i. e., whether the teaching is strictly utilitarian, as in a high school, or whether the faculty and students engage in research, as in a university. The latter has been the policy at Duke, as shown in the following statement by Dr. W. D. Forbus:

> Duke University School of Medicine, from its beginning in 1930, has maintained as its major objectives: (1) the cultivation and teaching of medicine on a strictly scientific basis; (2) the correlation of medical research with medical teaching at all levels of its instruction; (3) the continuous search for and experimentation with new or improved methods of teaching scientific medicine; (4) academic appointments, promotion and tenure are contingent upon satisfactory research interest and accomplishments; (5) all encouragement possible is given to the development of research interest and talent in the medical students, as well as in staff members, by maintaining research fellowships for medical students and offering an academic degree to medical students who complete acceptable research while in medical school; and (6) the school contributes toward the support of research from its own funds, makes all possible effort to supplement its own funds from outside sources, and encourages every research worker to pursue his own field of activity.

To this statement of the aims of the school, must be added the responsibility for providing more general practitioners, especially in rural areas.

3. TYPES OF MEDICAL FACULTIES

Medical faculties are of three types: strictly full-time, geographic full-time, or part-time and the proportions of each greatly affect the cost as well as the quality of medical instruction. A completely full-time staff, as at Johns Hopkins, Billings in Chicago, Mayo Clinic, and Ford Hospital, was the plan originally considered for Duke. It would have enabled the members of the faculty to give their full time to the training of students and research. The number of private patients, judging by the experience at Johns Hopkins, would be small, and their fees would have gone to the university. However, Drs. Harvey Cushing and Henry A. Christian, of the Harvard Medical School, with whom the policy was discussed, recommended the Harvard or geographic full-time program, on the grounds of the large budget needed for salaries under the Johns Hopkins and Billings full-time type of program and the possibility that private patients might be treated perfunctorily if the profit motive were eliminated. After all, a private patient, as well as a public ward patient, should have the benefit of a university

15. An average figure since the war; there were 245 in this group in 1950-1951.

16. Markee, J. E.; Harris, J. S., and Davison, W. C.: Programs to Provide More Physicians, J. M. Educ. **26**: 437-445 (Nov.) 1951.

medical faculty. A combination of strictly full-time, geographic full-time, and part-time was therefore adopted at Duke. All of the preclinical faculty and one-third of the clinical staff are on strictly full-time, with the remainder of the 92 full-time members of the faculty on a geographic basis. In addition, there are 34 instructors on a part-time schedule; some are residents, a few have offices in Durham and surrounding towns, and others work in two departments, for example, in medicine and physiology, neurology and anatomy, and pediatrics and biochemistry. Most of the instruction is done by the full-time staff, but that of the part-time group, though less in hours, is indispensibly valuable.

The strictly full-time faculty members receive salaries comparable with those of equal grades in similar institutions, but no income from private patients. The members of the geographic full-time faculty are paid smaller salaries, have their offices in the hospital, and may treat as many patients in the hospital and private diagnostic clinic as they wish, as long as their private practice does not interfere with their primary duties of instruction and research. Fees from these private patients are collected by the business managers of the private diagnostic clinic. Part of the gross income of this clinic covers the overhead of managers, secretaries, and technicians; part is used for research work by the departments concerned; part goes to the university building fund in lieu of rent; and the remainder is divided among the members of the geographic full-time faculty in proportion to the amount of work done by each member.

4. VARYING SUBSIDIES

Probably the greatest financiai difficulty in analyzing the cost of medical instruction is the varying subsidy required to cover the difference between the expense of operating a teaching hospital and the amount collected from patients. Regardless of whether the university or a governmental body pays this subsidy, it is an expense that should be borne by the community whose patients are benefited by the improved medical service in a teaching hospital. In the preparation of budgets, there is nothing uncertain in regard to three of the four major items, namely, the medical school expense, the hospital costs, and the amount of tuition. They are readily predicted. The first fluctuates with the cost of living, though every instructor knows that there is a considerable lag in the process. The hospital costs, as shown in table 1 for 1947 to 1950, usually climb. The tuition has now been raised to a figure that probably is stable unless there is further inflation. On the other hand, collections from patients are often unpredictable. In spite of rate increases, hospital income usually fails to keep pace with the greater rise in the costs of operation, though the extent of the difference between patient costs and patient collections is a great variable. In 1947, for example, the average daily patient-cost at Duke Hospital was $12.36 and the average daily collection from all patients was $10.12 [17]—a daily average loss of $2.24 per patient, which represents a contribution by Duke University to the charity medical care problem—a load that, as previously stated, should be carried by the community. In 1948, the daily costs had risen to $13.38 and the collections to $10.38, making the Duke University subsidy to North Carolina medical charity $3 per patient-day. However, in 1949, though the daily hospital costs had risen to $14.20, the collections had increased to $11.70 per day, and the university contribution was reduced to $2.50 per patient-day.

The wide differences in the net total costs in table 2, varying from $305,368 in 1933-1934 to $891,356 in 1946-1947, indicate the difficulties one encounters in trying to arrive at a stable net cost figure for medical instruction. In no other field of higher education will the net costs vary so much, regardless of enrollment. These fluctuations are mainly due to variations in hospital collections, as well as in foundation and governmental grants. The primary factors affecting these net costs are economic conditions. They determine the collections from patients, and the expenses of operating a medical school and hospital cannot be altered in direct proportion to such conditions. Likewise, the revenue from outside teaching grants varies with economic conditions and with foundation and governmental policies, and again costs cannot be adjusted rapidly enough to stabilize the cost of instruction. It also is obvious that tuition fees cannot be altered to meet these changes.

5. HOURLY TRAINING COST PER UNDERGRADUATE STUDENT

The hourly teaching cost per undergraduate medical student, as shown in table 3 for another endowed school, and in the estimate for Duke, involved so many variables that, in spite of many attempts and revisions, the Duke figures are too vague to be useful. Salaries for Duke instructors in the 1946-1947 budget totaled $393,994. Budgets for departments (including salaries) totaled $838,955. Each student had 5,148 hours of instruction. There were 290 students in 1946-1947. Therefore, $393,944 divided by 5,148 hours equals $76.52 (cost of teaching per hour of curriculum), and $76.52 divided by 290 undergraduate students equals 26 cents (cost of teaching per hour per undergraduate medical student). These figures would be doubled if calculated on the total departmental budgets instead of on the salaries alone. The figures for each of the two schools are so different that it is unlikely that the basis for the calculations were comparable. For example, the number of hours in the two curriculums are 10% apart (4,570 vs. 5,148). These discrepancies are further proof of the futility of attempting to correlate the budgets of two or more schools without a uniform accounting system.

6. TEACHING LOAD AND HOURLY TEACHING COST

The attempt to calculate the teaching load and the hourly teaching cost per instructor and per department was another noble experiment and as hopeless as the one to which President Hoover referred. In addition to all the accounting problems previously mentioned, no accurate division can be made of the duties of a medical faculty: (*a*) the instruction of medical, nursing and technical students, interns, and residents, (*b*) research, and (*c*) the professional care of patients, even if each instruc-

17. Collections include only direct payments by patients and by agencies for charity patients. They do not include Duke endowment payments, outpatient income, staff room and board receipts, or any other miscellaneous items.

tor punched a time clock every time he changed his activity. Nor can an accurate figure on the cost of instruction be obtained by listing the scheduled "contact" hours of each instructor with undergraduate medical students (excluding the more variable time spent with the house staff, patients, nurses, and technicians, and on research) and dividing these figures into the budgets of each department. Furthermore, each department, in addition to its medical school duties, provides considerable service to the hospital. For example, all the routine blood chemistry studies are performed by the biochemistry department and the blood and other cultures by the bacteriology department; all the surgical and other pathological studies are made by the pathology department; and much of the basic training for the hospital residency program is furnished by the faculties of the anatomy, physiology, pharmacology, and other such departments. It is practically impossible to estimate and apportion the time and money of these departments devoted to hospital and medical school activities. A summary of these attempts to calculate the hourly costs for the 1946-1947 budget is given in table 4, but its value is questionable, and that is an understatement.

TABLE 4.—*Teaching Load* and Costs, Duke University School of Medicine, 1946-1947 Budget*

Item	Mean	Minimum and Maximum †
Weekly teaching load per instructor ‡	8 hr.§	4-14 hr.§
Weekly research, hospital, and other activities per instructor	10 hr.	8-28 hr.
Hourly teaching cost per instructor (teaching salaries only)	$118.62	$45.55-201.70
Hourly teaching cost per instructor (including other expenses of the department)	179.55‖	104.90-596.03‖
Hourly teaching cost per department (teaching salaries only)	17.59	8.39-47.67
Hourly teaching cost per department (including other expenses of the department)	28.51‖	16.21-140.88‖

* Exclusive of the instruction of nurses, technicians, and graduate students (house staff and fellows). Instruction in medical schools is based on a 39-hour week, and not the usual 15-hour college week.

† It does not follow necessarily that the lower figure indicates that the individual instructor's teaching load is too heavy or that his salary is too low. Neither does the higher figure imply that the instructor spends most of his time in research or in the care of patients.

‡ The teaching load and costs are based on those of the full-time instructors, including geographic full-time instructors.

§ Teaching hours per week per instructor based on 33 weeks of 39 hours each.

‖ These figures would be more than doubled if they included the expenses of medical school (not university) administration, $30,400; medical library, $13,608; medical art, $15,507; experimental animals, $16,650; and maintenance, $62,500. Approximately $300,000 in research expenses paid by outside funds is not included.

SUMMARY

1. An attempt has been made to analyze the cost of medical instruction at the school of medicine and hospital of Duke University, an endowed institution.

2. The costs of medical instruction at any school are largely determined by (1) the accounting system—a uniform procedure for medical schools and hospitals is greatly needed, (2) the aims of the school, i. e., utilitarian, as in a high school, or engaging in research as in a university, (3) the proportion of strictly and geographically full-time and part-time faculty members, and (4) the varying subsidy required by the teaching hospital. The hourly teaching cost per student and the teaching load and the hourly teaching cost per instructor and per department are too variable by present methods of analysis to be determining factors in the picture.

3. On the basis of the outmoded and misleading yardstick of medical education calculated by charging the total university subsidy solely to the undergraduate medical students, the annual net total cost of medical instruction, including tuition, has varied from $305,368 in 1933-1934 to $891,356 in 1946-1947, and the annual cost per undergraduate medical student has ranged from $1,582 to $3,626 (exclusive of the higher costs in 1930, when the school was opened). The causes of these fluctuations are discussed.

4. In order that the medical students and the public may appreciate the financial problems of medical education as well as be informed of the services other than medical education that are erroneously charged solely to undergraduate medical students, the annual net total cost of the Duke University School of Medicine and Hospital has been honestly, realistically, logically, and fairly accurately distributed among such items as research, professional care of ward and outpatients, hospital expense, intern and resident training, and nursing and technician instruction. If the members of the community at large who benefit from these additional services reimbursed the university for them, the average annual net cost of educating an undergraduate medical student would be less than $1,000, which is comparable with that of other students in a university and, considering his relative value to the public, probably a worthy investment of university funds. This figure would be even smaller if reimbursement for the professional care of indigent patients were deducted from the budget.

5. The amount spent on medical education, by any standard of comparison, is modest considering the nature, thoroughness, and length of training. Furthermore, it must be remembered that medical, nursing, and technical students receive instruction on the basis of a 39-hour week instead of the 15-hour week that is the usual university load.

6. In spite of the low distributed cost of medical education, all medical schools greatly need additional financial support to maintain and improve their present standards and to increase their enrollment, so that the public may receive more and better medical care.

Employment of the Aged.—One of the basic needs of all people, young or old, is to retain position and dignity in a society that places value on contributory status and self-sufficiency. This means that older people must have a continuing opportunity to work and that compulsory retirement based on arbitrary chronological ages must be abandoned. How to achieve this is now occupying the attention of many employers and labor groups, as well as professional workers.

Society too has a great stake in the employment of older people as the period of life lengthens after the traditional retirement age. We are, indeed, approaching the time, unless we take steps to prevent it, in which the total years of dependency in childhood, youth and the older years will equal the period of gainful employment. It is generally agreed that this situation, if allowed to continue unchecked, threatens the level of living of the entire population. The solution seems to lie in recognizing the extended period of vigor in enabling more older workers to continue in paid, productive employment.—Clark Tibbitts, B.S., Aging: Implications for Public Health, *Public Health Reports,* February, 1952.

CARE OF SEVERELY PARALYZED UPPER EXTREMITIES

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and
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Physicians who care for patients handicapped by the after-effects of acute anterior poliomyelitis are becoming increasingly concerned over the problem of care for severely involved upper extremities. This interest has grown out of an increasing demand for care of this type, which is due not only to the high incidence of poliomyelitis during the past few years but also, in a great part, to improved methods of saving life during the acute stage of the disease. It is reasonable to believe that in the past these patients usually did not survive the acute stage. The purpose of this paper is to outline methods of care of the patient with severe flaccid paralysis of the upper extremities and to discuss ways of increasing functional capacity through the use of adaptive apparatus. No attempt will be made to discuss the countless details of apparatus design or the training techniques necessary to give the patient the best use of such apparatus.

In the 18 months prior to April, 1951, 324 patients with permanent severe weakness of the upper extremities were treated at Georgia Warm Springs Foundation. On gross analysis, it was found they could be classified into three groups, according to the severity and extent of involvement: 20 had functionally flail shoulders, arms, forearms, and hands bilaterally; 84 had somewhat less extensive involvement, although in all of these the strength of the forearm and hand and of either or both the shoulder and arm was below functional level; 219 had a functional level of strength in the forearm and hand but below this level in either the arm or shoulder or both. For practical purposes, the extent of involvement can be determined by evaluating the strength of the deltoid as the prime mover in the shoulder, of the biceps and the brachioradialis in the arm, and of the finger and thumb flexors in the forearm and hand.

STAGE OF POSSIBLE NEUROMUSCULAR RECOVERY

As for all involved bodily segments, treatment for the upper extremities during the early convalescent stage is based on the assumption that the patient will eventually recover normal use of the weakened or paralyzed muscles. Therefore, treatment consists of protection and support, gradually increased mobilization, and muscle stimulation and reeducation in all involved segments.

Protection and Support.—During the period of complete bed rest the shoulder and arm are supported by pillows and sandbags. No specific "neutral" or "natural" position is demanded; rather, the shoulders are rested in several positions of abduction and rotation during the day and night. These positions are dictated primarily by the patient's comfort. Similarly, the arm is supported in varying degrees of flexion and extension. No one position is maintained for more than two or three hours at a time. All painful positions and those requiring complete extension of a muscle should be avoided. The wrist and hand may be supported temporarily by small pillows, sandbags, and rolls of cotton batting, but more permanent splinting must be ordered immediately and applied as soon as it is ready. A simple metal thumb and wrist support is routinely used for this purpose in our institution (fig. 1). If there is severe weakness in the finger extensors a so-called platform attachment can be made to slip under the fingers and fasten onto the hand splint. This can be removed easily so that no persistent strain is put on the finger flexors. It may be curved to keep the fingers in a more normal position of slight flexion.

If the forearm and hand remain completely flail the hand splint is used to hold the wrist, fingers, and thumb in normal alignment, and it later serves as a base for the attachment of certain adaptive apparatus, which will be discussed in another section. Often there is recovery of enough strength to flex the fingers but not enough to extend them. This pattern of recovery occurs so frequently in the otherwise severely involved patient that it seems wise to mention it at this point. Even with this power to flex the fingers the hand has little functional value, because the fingers cannot be drawn away from the palm to permit grasping or pinching, or they cannot be extended for pressing, as in typing. The use of an extension assistive attachment on a splint enables very light rubber bands to substitute for the extensor muscles. It may then be possible for the patient to use his hand in a fairly normal manner, and his functional capacity is greatly increased. The bar to which the rubber bands are attached must be placed very carefully in order to abduct the fingers as well as extend them. Aluminum rings fitted snugly to the middle phalanx are more satisfactory than leather cuffs. The flexor power in the fingers may be so small that the fingers cannot be closed against the resistance of the ordinary rubber bands, even when cut to a single strand; in this case, very thin strips of dental dam rubber will often be strong enough to lift the fingers into functional extension but still permit flexion to occur.

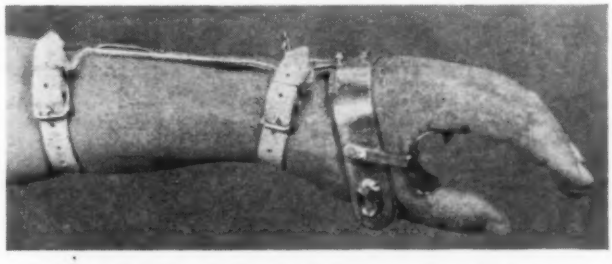

Fig. 1.—Basic splint used for support of wrist and hand; it is commonly called an opponens splint with wrist attachment.

From Georgia Warm Springs Foundation.
Read before the Section on Physical Medicine and Rehabilitation at the One-Hundredth Annual Session of the American Medical Association, Atlantic City, June 15, 1951.

When the patient is permitted to assume a semisitting position in bed, the forearms and hands should be rested on a bed table. This protects the shoulders and arms. The hands are supported by the splints mentioned previously. The table should be sufficiently high to support the arms in a position of 70 to 80 degrees forward flexion and abduction. When the patient is able to sit in a wheel chair, the same type of support and protection is maintained by a high lapboard attached to the arms or back of the chair. (fig. 2). If considerable tightness exists in the shoulders so that 70 or 80 degrees of flexion-abduction is not possible without abnormal scapular elevation and rotation, then a lesser angle is permitted until mobilization is accomplished.

Mobilization.—Exercises designed to maintain or regain functional ranges of motion in these segments should

Fig. 2.—Lapboard and overhead sling attachments for wheel chair.

be started immediately. Initially they consist merely of changing the patient's position every few hours. If there is limitation of movement, gently passive motion is provided several times each day, with increasing stretching force applied, but there must be no hurry to release existing tightness. Too vigorous stretching not only will tend to cause persistent pain but will actually result in increasing the tightness. The use of moist heat is an aid to mobilization, but it must be accompanied or followed by motion to be of any real value. A common fault is to begin the stretching both too late and too vigorously.

Muscle Stimulation and Reeducation.—Several ways to facilitate the recovery of voluntary control of motor units have been developed through experience with and knowledge of the physiology of the neuromuscular system. First, the bodily segments controlled by the involved muscles must be put into a position in which movement can be initiated and carried out with the least effort. Ideally, the movement should closely approximate normal functional patterns. A second method is to excite flexion and extension reflexes by passive movements. These movements may consist of high frequency, almost vibratory motion through a short range or may be a slower alternate shortening and lengthening of the muscle through a wider range. Mass movements or combinations of movements may also be used to excite initial voluntary use of recovering motor units. These movements should be within the range of normal usage. Electric stimulation of the involved muscles may be used as a means to focus the patient's attention on the muscle under treatment and thus facilitate the return of voluntary control; however, this is a tedious and usually painful procedure and, in our experience, has seldom shown any advantage over assistive splinting and passive motion.

The apparatus most commonly used to assist and encourage voluntary motion in the shoulder and arm are the overhead sling and the lapboard (fig. 2). The overhead sling brings the shoulder into a position of function. It consists of two leather cuffs attached to an ordinary screen door spring, which in turn is attached to a rigid support. The most practical support is a metal rod approximately ⅜ in. in diameter and about 5 ft. long. One end of this rod is attached to the outer surface of the lateral upright of the back of a straight chair on the side of the involved upper extremity. Bilateral slings can be used if both shoulders are involved. The rod is bent to a right angle approximately 22 inches from the upper end. The loop at the end of the spring is slipped over this horizontal end of the upright support so that the spring and attached cuffs hang downward. With the patient seated in the chair, the supports should be adjusted so that the arm is held away from the body in a position of flexion and abduction at an angle of approximately 70 to 80 degrees. The cuffs fit under the elbow and the distal third of the forearm. The cuff at the elbow has a circular hole in the center that anchors it at this point, and soft leather or felt loosely stitched across this opening adds comfort. If the patient is wearing a hand splint, a small ring can be attached to it, and the cuff that ordinarily supports the forearm can be replaced by a clip that is easily hooked onto the ring. The ring can be placed so that the pull of the overhead sling holds the arm in a desired position of supination or pronation.

When the upper extremity has been properly positioned by the sling, the patient should have use of a table, or should have a lapboard attached to his wheel chair, of such height that the elbow clears the top of the table by one-half to one inch. The forearm cuff should be adjusted so that the forearm slopes downward and the hand is at the table in the functional position. As mentioned previously, the purpose of this sling is to bring the shoulder into a position of function. The spring and leather strap attached to the cuffs allow at least 100 degrees of horizontal motion. The spring permits vertical motion of the arm by directly augmenting any power in the deltoid muscle groups and assisting all muscle groups that take part in forward flexion and abduction. Also, the change of tension in the spring stimulates flexion and extension reflexes in the muscle groups about the shoulder, particularly in the deltoid muscles, and thus acts as a means of facilitation. If strength returns to the segments of the

upper extremity, graduated progressive types of muscle reeducation should be instituted. These are well known and will not be discussed here.

STAGE OF ADAPTATION TO RESIDUAL HANDICAP

If, after a period of four to six months of adequate treatment, the shoulder, arm, forearm, and hand show no muscle strength above a "trace" to a "poor minus" level it may be assumed that further muscle reeducation, carried out over an indefinite period of time, will not bring back significant functional strength. The problem then is to make the most use of whatever muscle power has been restored to develop some degree of functional independence. To accomplish this it is necessary to provide mechanical apparatus that will permit the patient to move his hand over the surface of the desk or table and to bring his hand to his head. If it is possible for the patient to effectively manipulate such apparatus, the next step is to provide holders to be attached to his hand or hand splint for certain normally used objects, such as a spoon, toothbrush, pencil, lipstick, cigarette holder, glass, electric razor, and telephone receiver. These items can be positioned within the range of the patient's head so that they can be used with some degree of adequacy and independence.

The basic apparatus for assisting the patient in moving his hand about a horizontal surface is the overhead sling already described. This sling usually must be modified by the addition of a so-called suspension feeder to

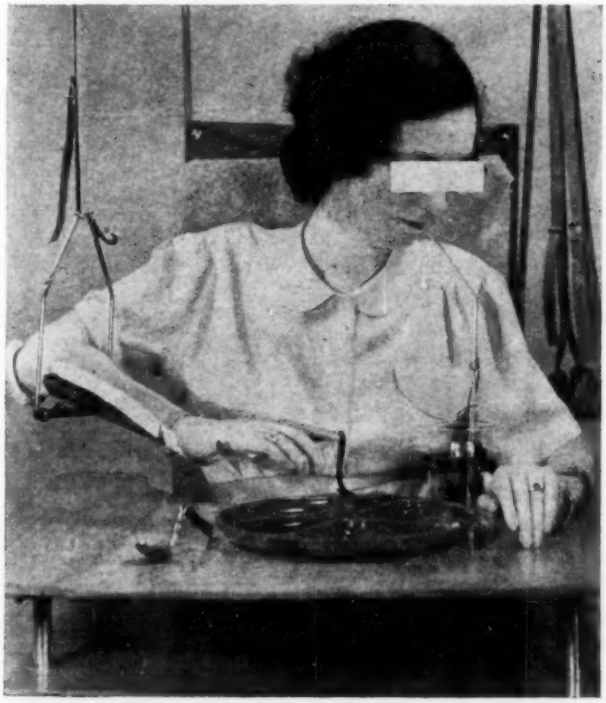

Fig. 3.—Suspension feeder (left) attached to the overhead sling for support of the forearm and glass holder (right) with attached glass straw.

permit the patient to bring his hand toward his mouth (fig. 3). This feeder consists of a cradle for the forearm attached to the sling by a swivel joint to permit flexion and extension of the elbow and horizontal circular movements of the forearm. As the patient shifts his body toward the side with the feeder, the elbow is depressed and the hand raised and brought inward. The opposite motion raises the elbow and lowers the hand. This method is used by patients in whom no shoulder elevation or depression is possible. If the patient has voluntary control of shoulder depression a greater degree of precision is possible in positioning the hand and bringing it to a desired level. Even with severely limited strength in

Fig. 4.—Feeder mounted on a stand.

these muscle groups some control can be obtained by thrusting the head forward and from side to side. Fortunately, many of these patients have some residual strength in the upper trapezius, and the elevation and depression of the shoulder by contraction and relaxation of this group of muscles is a great help in using the feeder. The feeder can be used not only for feeding but also for such activities as moving a pencil, turning the pages of a book, typing, and using a toothbrush. If, in addition to some voluntary movement in the shoulder girdle and stability in the trunk, the patient also has some power to supinate the hand and flex the fingers many more activities become possible. One immediate advantage is the ability to use a feeder mounted on a stand instead of suspended from the overhead bar (fig. 4). This feeder is not only more portable and less conspicuous but can be moved about the table as necessary, allowing far greater precision of movement. It may also be possible for the patient to use a small portable feeder that can be easily clamped to any table. This has the obvious advantage that it can be carried in a pocket or purse, but it has the disadvantage of being clamped in a single position on the table.

After it is found that the patient can be taught to move his arms in the feeder about the table or lapboard and to bring his hand toward his mouth, apparatus must be provided to permit him to carry out the activities of eating, hygiene, writing, and telephoning. Effective manipulation of the feeder is usually the deciding factor in determining the practicality of such apparatus for these patients.

Feeding.—If the patient's hand is completely flail the spoon or fork must be attached to the hand by rings or clips or to the hand splint or feeder cradle by means of a "T-bar." A rectangular sleeve fastened to the fork or spoon permits easy attachment to and removal from this T-bar. The shape and length of the spoon or fork

must be modified to suit the individual patient. Because the patient lacks the ability to supinate and pronate his hand, a swivel fork or spoon must often be provided so that the spoon bowl or fork prongs always hang horizontally and the patient can bring the food to his mouth without spilling it (fig. 5). The degree of swing of the swivel end is controlled by stops that stabilize the spoon or fork when the patient is scooping up food. Patients with such severe involvement will never be able to lift a glass or cup to the mouth, and holders must be made for positioning these within the range of the patient's head movements. Glass tubes or straws can then be used for drawing the fluid into the mouth (fig. 3). The correct type of dish may be as important a factor in successful feeding as the feeder itself. A dish with ¾ in. to 1 in. high sides may be necessary, at first, as a help in pushing the food onto the fork or spoon. If the patient's involvement is severe he may be able to move the feeder in only one plane or groove, and only a small area of the plate can be used. In this case some arrangement must be made for turning the plate as necessary. A Lazy-Susan

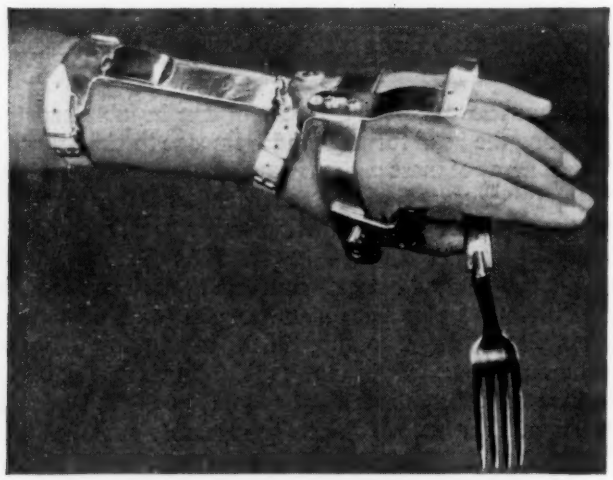

Fig. 5.—Swivel fork attached to the basic hand splint.

type of apparatus can be made to hold the plate and can be turned by one of several methods, including a ratchet and spring activated by swinging the feeder or by abduction and adduction movements of the knee if there is strength in the hip and thigh.

Hygiene.—The possibilities of obtaining independence in personal hygiene are limited for these patients, but they can be taught to scrub their teeth and often to shave with an electric razor or to apply make-up. Often, a man can be taught to comb his hair. The toothbrush, lipstick, or comb may be attached to the hand splint or feeder cradle in the same manner as the spoon or fork is attached. The electric razor must be attached to the top of a stand that brings the razor to face level; by moving the head from side to side, all portions of the beard can be reached. A desk lamp with a heavy metal base and a gooseneck shaft makes an ideal stand on which to attach the razor.

Writing and Typing.—For the severely involved patient, writing is not only possible but becomes practical if he is willing to practice in order to develop speed and legibility. The pencil or pen is fastened to the hand splint or feeder, and movements of the trunk, shoulder, and head are used to achieve a modified Palmer method of writing. Typing is much more easily accomplished; contact with the keys is made with a wooden or plastic rod. One kind of typing stick has a rubber or plastic mouth piece that is held between the teeth, and the keys are struck by means of head movements. A slip-on rubber eraser or the rubber bulb of a medicine dropper is attached to the contact end. Typing can also be done with sticks attached to the hand splints or feeder cradles. This is somewhat more difficult for the severely involved patients, but it has the advantage of bilateral use of the sticks. Electronic typewriters must be used because of the minimal pressure needed to activate the keys and the automatic carriage movement.

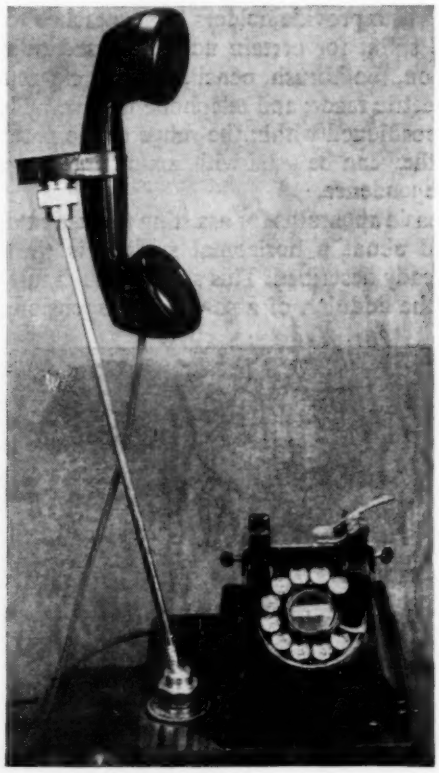

Fig. 6.—Holder for telephone receiver; note the hinged weight on the base used to open and close the circuit.

Telephoning.—Ability to use the telephone adequately is an important part of the patient's rehabilitation. Obviously, the mouth piece and receiver must be mounted on a support within the range of the patient's head movement (fig. 6). Such phone holders are available commercially or can be made similar to the mount suggested for the electric razor. It is also necessary to provide a means of opening and closing the circuit. This can be done by hinging a small weight over one of the buttons of the usual city phone or over the receiver hook of the older model. This weight can be moved on or off the circuit breaker by striking it with the feeder held hand. If dialing is necessary, a wooden or plastic rod can be made similar to the typing stick; a type that is held between the teeth is the most practical for these patients.

REPORT OF A CASE

A 25-year-old woman was admitted to the Georgia Warm Springs Foundation for functional training in March, 1950. She had contracted acute anterior poliomyelitis at the age of 15, with severe involvement throughout the back, abdomen, and all four extremities. Over a four year period, from October, 1940, through November, 1944, she was hospitalized for care on four different occasions, for a total of 25 months. Muscle examination at the time of admission revealed that the level of strength of all skeletal muscles ranged from "zero" to "poor minus," except for the posterior neck groups, which rated "good minus," and the intrinsic muscles of the fingers of the left hand, which ranged as high as "fair plus," although there were no intrinsic muscles functioning in the left thumb.

In a functional test given on admission, it was found that the patient had learned to type and to dial a telephone, both with a stick held in her mouth. No other functional activity had been achieved. Because of her severe involvement, it had been necessary for her father to place her in a large wooden chair early in the morning before he left for work. She had to remain in this chair in an erect or semireclining position until her father came home in the evening, because her mother could not lift her; if she didn't feel capable of staying up all day she had to remain in bed until her father came home in the evening.

At the foundation the patient was fitted with bilateral cock-up splints with T-bar attachments to support her fingers and to hold functional apparatus; bilateral suspension feeders; a double lapboard; a holder for her toothbrush, lipstick, pen, and pencil; a plastic mouth piece for a mouth typing stick; a holder on the right feeder for the mouth typing stick; and bilateral plastic dialing rods for typing. In addition, a telephone holder was attached to her portable wheel chair. At the time of her dismissal, June 17, 1950, after a three month training period, her functional test showed that she could eat two meals a day, using a spoon and fork and could drink independently from special apparatus. She could brush her teeth, put on her own lipstick, write letters with a pen or pencil, type with typing sticks attached to her hand splints, and use a telephone. She was fitted with a special portable chair, and her mother and father were both taught how to get her into and out of bed in one and one-half minutes. Thus, in a period of 3 months, this young woman who had been completely helpless for 10 years was taught to perform independently many useful activities.

CONCLUSION

The purpose of this discussion is to stimulate interest in the care of the patient with severely paralyzed upper extremities. Unfortunately, many physicians tend to think of recovery in terms of the patient regaining the ability to walk. Over the years, effective apparatus and training techniques have been developed to help patients with severely involved lower extremities, but little has been done for the patient with paralyzed upper extremities. The restoration of some degree of independence to these latter patients is actually far more dramatic and gratifying. As more awareness of and interest in this problem develops, great strides should be made in the development of functional apparatus and training techniques. It must be remembered that this discussion emphasized only the care of patients with the most severely involved upper extremities. When recovery of even a small amount of strength occurs in any part of an upper extremity, the possibilities of increased functional capacity through the use of special apparatus and training are greatly extended.

TESTICULAR TUMORS

Ole J. Jensen Jr., M.D., Seattle

Although the prognosis of tumor of the testis is better than that of other tumors of the genitourinary tract (with the exception of carcinoma of the penis), the fact that they occur in the prime of life produces a grim picture indeed. Following World War II several large series of cases were reported, the outstanding of which was the series of 922 reported by Friedman and Moore [1] from the Army Institute of Pathology. Since the majority of servicemen are in the age bracket in which most testicular tumors occur, a large number of cases were collected between 1940 and 1946. It was found that the incidence of testicular tumors in servicemen in World War II was 1 in 10,000 troops. Testicular tumors account for 3% of the malignant lesions of the genitourinary tract in the male and between 1 and 2% of all malignant tumors.

Age.—In general, testicular tumors occur most frequently during the active sexual life of the patient. They have been reported in patients from 6 months to 78 years old, but they occur most frequently in men from 18 to 40 years old. Teratoma occurs earlier in life than seminoma. The average age of patients with teratoma is in the late 20's, while for seminoma it is in the early or middle 30's.

Location.—Tumors of the testis are found slightly oftener on the right than on the left side in the proportion of about 53: 47. Gill and Howell [2] reported on 156 cases of bilateral testicular tumors. In about 50% of these cases the second malignant lesion occurred anywhere from a few weeks to 13 years later than the first. Many of the second tumors also occurred in ectopic testes.

Histogenesis.—The tissue of origin of testicular tumors is totipotential and capable of developing along lines similar to those found in the earliest phases of differentiation in the fertilized ovum. The first type of differentiation is the trophoblastic differentiation, represented in the testicular tumors by chorioepithelioma. The second type of differentiation is concerned with embryogenesis, and consists of elaboration of the three germ layers. This is represented among testicular tumors by embryonal carcinoma, teratocarcinoma, and adult teratoma. The third line of development is concerned with the formation of reproductive tissue and is represented among testicular tumors by seminoma. New growths of the male gonad differ in that they do not reproduce testicular tissue but express the latent unlimited potentialities of the embryonic germ cells from which they arise.

Pathology.—Friedman and Moore and others have found that 96% of testicular tumors can be classified as

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1. Friedman, N. B., and Moore, R. A.: Tumors of Testis: Report on 922 Cases, Mil. Surgeon **99**: 573-593 (Nov.) 1946.
2. Gill, R. D., and Howell, R. B.: Primary Bilateral Testicular Tumor, J. Urol. **59**: 940-947 (May) 1948.

one of four cellular types, and this classification is probably the most commonly used at the present time:

1. About one-third of all testicular tumors are seminomas. They are moderate-sized greyish tumors, which are circumscribed but not encapsulated. Microscopically they are monocellular, and are composed of round or polyhedral-shaped cells, with a large nucleus and a central nucleolus. The cytoplasm is clear and the border distinct. The cells are uniform.

2. Approximately 20% of the tumors are embryonal carcinomas. The tumor is usually large and replaces the entire testicle. There are usually many hemorrhagic areas present. The cells vary considerably in their structure. Papillary adenocarcinoma, adenocarcinoma, or undifferentiated carcinoma are seen. They are often confused with seminoma, although they differ greatly in cell type and biological behavior, and show a greater degree of malignancy microscopically than the seminoma. These are neoplastic expressions of the unlimited potentialities of embryonic cells. The chorioepithelioma also falls in this group.

3. Teratomas make up about 7% of the tumors of the testis. They are moderate-sized, with firm grey-white tissue containing cystic spaces, small yellow or white foci of epithelium, and islands of blue translucent cartilage. They show clearly the derivatives of more than one germ layer. They are cystic and solid tumors composed of adult tissue that shows no evidence of malignancy. These benign-appearing tumors are capable of metastasis, and are potentially malignant.

4. Teratocarcinomas make up 35% of all testicular tumors. They consist of histologically malignant tissue with teratoid elements. The malignant cells may be seminoma or embryonal carcinoma. Malignant changes can also take place within the teratoid structures themselves.

It must be emphasized that more than one cellular pattern is often seen in testicular tumors. Moore [3] found that in 237 tumors 368 cellular types were observed. If, for example, a tumor composed largely of seminoma is found to have embryonal carcinoma in some sections, the five year survival rate is considerably reduced, or, if an embryonal carcinoma is found to contain chorioepithelioma, the prognosis is also worse.

Metastases occur early and spread by way of the lymphatics and blood vessels. Metastasis to the inguinal lymph nodes is rare. The lymphatics of the testicle drain along the spermatic vessels, cross the ureters, and empty into the lateral lumbar nodes. These nodes drain to the subdiaphragmatic and mediastinal nodes and to the lungs. Metastasis to the lungs can also occur by way of the blood vessels. Lewis [4] found that 43% of the patients with testicular tumors had proven metastases on admission to Walter Reed General Hospital, and in an additional 28% metastases eventually developed. Rusche [5] discovered a significant relationship between the type of testicular malignancy and the presence of metastases at the time of diagnosis. Among patients with seminoma, 15% showed early dissemination as compared with 26% of the embryonal carcinoma group, 35% with adult teratoma, 42% with teratocarcinoma, and 100% with chorioepithelioma.

The presence of hormones in the urine of a patient with a testicular tumor indicates that there are endocrine cells in the tumor. If the tumor is removed and the hormones persist, metastatic secreting cells are present.

Symptoms.—There are no pathognomic symptoms of a testicular tumor. The initial symptom is commonly a painless swelling of the testicle. Quite frequently there has been some degree of swelling present for months or even years, and for no apparent reason the swelling increases. Pain is usually a late symptom, resulting from distention of the capsule either by enlargement of the tumor or by hemorrhage into the tumor. The history of heaviness of the testicle is important, as it may lead to the diagnosis in the presence of apparent epididymitis or hemorrhage into a tumor. Occasionally a patient complains of a small, hard lump on the testicle. History of trauma is common, but the trauma usually occurs after the tumor has enlarged. Persistently recurrent back ache is often an early symptom of metastasis, even when no evidence can be found clinically or roentgenologically. Occasionally these patients have excruciating pain, and in order to obtain relief will lie with their knees and thighs in a position of exaggerated flexion.

Recession of the mass by absorption of blood may bring about actual decrease in size and further mask the diagnosis. Patients with chorioepithelioma frequently present themselves with symptoms of metastatic involvement when no testicular mass can be felt. Seminoma, on the other hand, rarely metastasizes without a palpable primary tumor. In Ormond and Best's [6] series of 40 cases the presenting symptom was painless enlargement of the testicle in 18, painful enlargement in 8, metastatic pain in 10, swelling following injury in 4, and hematuria in 1; one tumor was discovered in a routine examination. Gynecomastia may occur at any time during the course of the disease, and indicates hormonal changes.

DIFFERENTIAL DIAGNOSIS

Most tumors are seen late, after they have enlarged, and the diagnosis at this stage is not difficult unless complicated by hemorrhage, hydrocele, or epididymitis. Errors in diagnosis, however, are common. In Rusche's review of 131 patients, incorrect diagnoses had been made for 16. Six tumors were diagnosed as hydrocele, 7 as epididymitis, 2 as strangulated undescended testis, and 1 as a spermatocele. Wyndham [7] reports 41 cases of testicular tumors in which 8 were misdiagnosed, all of them having been treated as inflammatory lesions. The need for follow-up on all cases of epididymo-orchitis is obvious. Kimbrough and Denslow [8] in a review of 32 cases of testicular tumors found that in only 18, or 56%, was the initial diagnosis tumor. Of the other 14, 11 were diagnosed or treated as epididymitis, 1 was diagnosed as hydrocele, and 1 as varicocele. They concluded that all scrotal masses should be considered malignant until

3. Moore, R. A.: Teratoid Tumors of Testis, J. Urol. **65**: 693-708 (May) 1951.

4. Lewis, L. G.: Testis Tumors: Report on 250 Cases, J. Urol. **59**: 763-772 (April) 1948.

5. Rusche, C.: Clinical Data on 131 Cases of Testicular Tumors, read at Western Section Meeting, American Urological Society, June, 1951.

6. Ormond, J. K., and Best, J. W.: Prognosis of Testicular Tumors, J. Urol. **60**: 272-279 (Aug.) 1948.

7. Wyndham, N. R.: Tumors of Testicle: Relationship of Structure to Course and Prognosis, J. Internat. Coll. Surgeons **12**: 431-438 (July-Aug.) 1949.

8. Kimbrough, J. C., and Denslow, J. C.: Malignant Disease of Testicle, J. Urol. **65**: 611-614 (April) 1951.

proved otherwise. Bimanual examination will help to rule out epididymitis, lesions of the spermatic cord, spermatocele, and lesions of the scrotum. A complicating hydrocele cannot be differentiated from tumor without exploration. X-ray examination may give some information, in view of the fact that calcification, if present, is in the central portion of a tumor, while a calcified hydrocele shows increased density at the periphery. If an enlarged testicle is encountered, a tumor is still the most likely possibility. If the mass is hard or irregular in shape, immediate orchiectomy is to be considered. Biopsy should not be done. Rusche reports a case in which a biopsy revealed granulomatous tissue. Four months later there were extensive metastases, and the testicle then contained teratocarcinoma.

Although the tumor is usually found within the body of the testicle, it will occasionally invade the epididymis, and I have encountered one case (case 4) in which a teratocarcinoma was separated from the testicle and epididymis by a capsule of its own and had not invaded the surrounding structures.

Hemorrhagic infarction must also be considered in the differential diagnosis. Although uncommon, it cannot be differentiated from tumor without exploration or waiting a considerable length of time. Laboratory procedures may be of value, but should not be cause for delay of operation. A positive result of an Ascheim-Zondek test is an aid, but negative findings do not rule out testicular malignancy. Neither does a positive Wassermann reaction rule out the presence of malignancy. The diagnosis of epididymitis in a male during active sexual life should be made with caution. Because of the antibiotics and sulfonamides, epididymitis is occurring less frequently than formerly. A careful follow-up of epididymitis is most important in order to rule out the presence of a tumor.

TREATMENT

As soon as the diagnosis of a testicular tumor is made, the tumor should be removed and carefully examined. Orchiectomy for a tumor should completely remove the primary growth without spreading metastases. Too frequently the operation is improperly performed, with serious consequences. The testis and 8 or 10 cm. of the spermatic cord should be removed as safely as possible. The incision, therefore, is made over the inguinal canal, and the spermatic cord is clamped at its exit from the abdominal cavity.

Lewis and Hinman have advocated retroperitoneal dissection of the regional lymphatics to the renal pedicle in addition to removal of the testicle, epididymis, and spermatic cord. Recently there has been a renewed interest in the radical procedure to remove tumors that do not respond to x-ray therapy. Lewis advocates radical orchiectomy for any type of testis tumor because of the possibility of including other malignant elements unrecognized in the routine section. Cahill [9] reports 29 cases of radical removal without operative mortality and stresses that the operative mortality for the radical operation is no greater than that for simple inguinal removal.

It is only by earlier operative removal of the tumor that the number of cures can be increased. In any case of testicular swelling, whether it is painful or painless, inflammatory or hemorrhagic, testicular tumor must be suspected, and more frequent and earlier removal carried out. The therapeutic value of irradiation has been shown by greatly increased survival rates. Seminomas are among the most radiosensitive tumors, and x-ray therapy is always used for them. If there is an admixture of other tumor types with the seminoma, radiation should be given in larger doses according to the requirement for the more resistant type of tumor. When metastases are already present, treatment consists mainly of irradiation. Embryonal carcinomas and the carcinomatous elements of teratocarcinomas are much more radioresistant than seminomas, but they vary considerably in their sensitivity.

PROGNOSIS

Sauer and Burke [10] concluded that the prognosis depends mainly on three factors: the histopathology, the biological properties, and the stage of the disease at the beginning of treatment. The immediate prognosis for embryonal carcinoma and chorioepithelioma is bad. The prognosis for teratocarcinoma and adult teratoma is poor, but the outlook for seminoma is good. O'Connell and Geschickter [11] found a 60% 5 year survival rate in seminoma. The survival rate of patients with teratoma was 24%, and with embryonal carcinoma 14%. There was an over-all 5 year survival rate of 31.7%. They further found that the mortality rates were greatest in the first and second years after operation. It is important to distinguish between seminoma and embryonal carcinoma, since the prognosis for seminoma is four times as good as that for embryonal carcinoma. The prognosis is poor in embryonal carcinoma, with or without an admixture of chorioepithelioma, and least favorable for patients with simple chorioepithelioma. Patients with differentiated or mature cell tumors have a comparatively fair prognosis, but, if the tumor consists of undifferentiated cells of embryonal origin, the prognosis is less favorable. Ormond and Best in an analysis of 40 cases of malignant tumor of the testis found that metastasis appeared earlier and more frequently in persons under 30 years of age. The three year survival rate, irrespective of metastasis, in persons under 30 years of age was 16.6%, but in patients over 30 years of age it was 57.1%. The improvement in the prognosis of malignant tumors of the testicle is due to the combined use of early orchiectomy and postoperative irradiation.

The following cases are reported because of their clinical and pathologic interest. They demonstrate the diagnostic problems in testicular tumors and also emphasize the importance of early orchiectomy.

CASE 1.—A 27-year-old white man sought medical attention in January, 1949, because of sudden onset of pain and swelling in the right testicle. He also complained of pain in the right flank and back. Treatment at that time consisted of testicular support and sulfonamide therapy. During the ensuing three months there was gradual improvement in the pain and decrease in the swelling, but with exacerbation of pain and swelling the patient sought further medical advice and relief. When first seen in March, 1949, he admitted that prior to the original onset of pain he had noticed a small, hard mass on the inner side of the right testicle. He also noticed that the testicle was heavy.

9. Cahill, G. F.: Results of Surgery in Tumor of Testis, J. Urol. **66**: 280-284 (Aug.) 1951.

10. Sauer, H. R., and Burke, E. M.: Prognosis of Testicular Tumors, J. Urol. **62**: 69-74 (July) 1949.

11. O'Connell, H. V., and Geschickter, C. F.: Tumors of Testis: 5-Year Follow-Up Study U. S. Armed Forces M. J. **1**: 719-732 (July) 1950.

Examination revealed slight tenderness over the right renal region. No palpable masses were noted in the abdomen. The left testicle was normal in size, shape, and consistency. The right testitcle could not be palpated distinctly. There was a nodular, firm, tender mass measuring 8 by 6 cm. It did not transilluminate. The scrotal skin was not adherent to the mass. Rectal examination revealed no abnormalities. Results of urinalysis and complete blood count were normal. There were no tubercle bacilli in the 24 hour urine concentrate. Results of a tuberculin test and a chest roentgenogram were negative. The intravenous pyelogram revealed normal renal excretion and concentration, with no obstruction. There were no extrinsic shadows seen. Psoas shadows were normal. There was no displacement of the ureters or bladder.

On March 26, 1949, with the patient under spinal anesthesia, an inguinal exposure of the cord was carried out. The cord was clamped with rubber-covered intestinal clamps, and the testicle examined. A hard nodule was located at the junction of the testicle and epididymis, with two smaller nodules lying in the lower portion of the testicle. The cord was ligated high in the inguinal canal, and the cord and testis removed. The immediate postoperative course was uneventful. The pathological findings revealed embryonal carcinoma. The patient received x-ray therapy. Five months after the orchiectomy a chest roentgenogram revealed an obvious gross metastatic pulmonary lesion. The patient died six months later.

Comment.—In this case a testicular tumor could have been suspected and exploration performed when the patient first sought medical attention. Sudden onset of pain and swelling of the testicle are not infrequent with testicular tumor, and usually signify hemorrhage into the tumor. In 6 of Auerbach's [12] series of 26 cases of testicular tumors, pain was the presenting symptom. Testicular neoplasm should be suspected in all cases of apparent epididymitis. A history of a mass, swelling, or increased weight of the testis prior to the pain can frequently be obtained, as in this case, on careful questioning.

CASE 2.—This 41-year-old white man was first seen Oct. 5, 1948, with a small nodule at the base of the left testicle. The patient stated that he had not noticed change in the size or consistency of the mass for a period of two years. There was no pain. He denied backache, loss of weight, and venereal disease. The physical examination revealed no abnormality but a round, firm, 1.5 cm. sized mass at the base of the left testicle. It was separate from both the testicle and epididymis. It was not adherent to the skin. It was not tender. The laboratory findings were negative. A chest roentgenogram showed no abnormalities.

Exploration of the left scrotal contents revealed a small, round, rubbery, 1.5 cm. sized grey nodule lying between the testicle and the epididymis, entirely separate from both, with a capsule of its own. The tumor was shelled out without difficulty, with no evidence of adherence or invasion, and therefore was not considered malignant. The pathological findings revealed teratoma with adenocarcinoma. A high ligation of the cord was then carried out, and the cord, epididymis, and testicle were removed. A careful pathological search failed to reveal evidence of tumor tissue in the testis or epididymis. X-ray therapy was not considered advisable in view of the absence of tumor within the testicle and the radioresistance of this type of tumor. The patient is alive and well with no evidence of metastasis three years after orchiectomy.

Comment.—This type of lesion could easily have been considered epididymal induration or a benign cyst of the epididymis. Testicular neoplasms outside of the parenchyma of the testicle are rare. In reviewing the literature I have found no case of this kind reported. It is well known, however, that testis tumors can arise from any part of the abdomen occupied in embryonal life by the anlage of the testes, but such tumors rarely descend with the testis. In this case the tumor must have originated in this manner and been so intimately adherent to the testis that it descended with it.

CASE 3.—This 48-year-old white man complained of decrease in size of the right testicle of three years' duration. He denied mumps, injury, and venereal disease. The patient had never had tuberculosis or any other serious illnesses. Chest roentgenograms revealed no abnormalities. He was married and had three children. There had been no weight loss. He complained of an ache in the groin, but denied testicular pain. He had mild back pain but no urinary symptoms.

Results of the physical examination were entirely normal except in regard to the genitalia. The left testicle was normal in size and consistency. The right testicle was small and soft. There was a small nodule at the lower portion of the testicle, which appeared to be within the parenchyma of the testicle. It was not tender. An exploration revealed a pea-sized tumor at the lower pole of the right testicle. A high ligation of the cord was performed. The pathological report revealed seminoma, and the patient received x-ray treatment.

Comment.—This is an example of actual decrease in size of the testicle with a tumor present and without previous hemorrhage into the tumor. It emphasizes the importance of early removal of a testis with any suspicious nodule or induration.

CASE 4.—This 21-year-old unmarried white male had a sudden onset of pain and swelling of the right testicle Oct. 3, 1949. He denied injury, urinary infection, or exposure to venereal disease. When first seen two and one-half weeks after the onset of symptoms, the testicle was large and tender. Temperature was normal, and the white count was normal. The patient had lost 8 lb. (3.6 kg.) in two and a half weeks. He denied previous testicular heaviness or tenderness.

The left testicle was normal in size, shape, and consistency. The right testicle was two times the size of the left, extremely tender and hard. An intravenous pyelogram revealed no abnormalities. Three 24 hour urine specimens contained no tubercle bacilli. Following bed rest, testicular support, and sulfonamide therapy for four days the pain subsided, but the tenderness remained. The cause of the testicular swelling at this time was questionable. It did not have the appearance of either epididymitis or testicular tumor. There was no evidence of torsion or hydrocele. During the ensuing six weeks the mass decreased considerably in size, and the tenderness subsided. Ten weeks after onset the right testis was round, hard, smooth, and symmetrical. It did not transilluminate. Tumor was considered likely since the mass was quite hard. The scrotal skin was adherent to the base of the mass. A chest roentgenogram showed no abnormalities.

Exploration was carried out through an inguinal incision. The mass was firmly adherent to the scrotum and was dissected off with difficulty. The tunica albuginea was markedly thickened. There was no evidence of torsion of the cord. The testicular tissue was dark and hemorrhagic, and there was a large, hemorrhagic mass lying between the testicle and epididymis. Although a tumor was not seen or palpated, it could not be excluded. Since the testicle and epididymis were destroyed, removal was the logical course. The pathological examination revealed hemorrhagic infarction of the testicle and epididymis with complete destruction.

Comment.—Barrington [13] in 1914 reported on 15 cases of hemorrhagic infarction. The pathological findings indicate that interstitial hemorrhage occurs into a previously healthy testis. Aseptic necrosis of the parenchyma follows presumably from increased pressure inside the rigid tunica albuginea. The subsequent shrinking is due to the gradual replacement of the necrosed parenchyma by fibrous tissue. The cause of hemorrhagic infarction remains unexplained.

12. Auerbach, O.; Brines, O. A., and Yaguda, A.: Neoplasms of Testis, J. Urol. **56**: 368-374 (Sept.) 1946.

13. Barrington, F. G. F.: Case of Suppurative Colinephritis, Brit. J. Surg. **2**: 260-262, 1914.

Although in this case the enlargement proved to be due to hemorrhagic infarction rather than tumor, there is no diagnostic means of distinguishing one from the other. I have encountered two subsequent cases of hemorrhagic infarction both of which were suspected but could not be proven prior to operation.

CASE 5.—A 26-year-old white man was first seen Nov. 11, 1949, at which time he had noticed a lump in the right testicle, which had been increasing in size for several months. He had noted the testicular swelling in April, 1949, at which time he was hospitalized for a back injury. However, he thinks (but is not certain) that he had a swelling of that testicle when he was discharged from the Army in 1946. He did not notice heaviness of the testicle at any time, and there was no back pain or loss of weight. He had been in excellent health and was planning marriage.

Physical examination was negative except for the genitalia. The left testis was normal. There was a hard mass firmly adherent to the anterior surface of the right testicle. The mass was separate from the epididymis and appeared to be within the parenchyma of the testicle. Results of urinalysis were negative. An intravenous pyelogram and chest roentgenogram revealed no abnormalities. The preoperative diagnosis was testicular neoplasm. A right orchiectomy and high ligation of the cord was performed. The pathological findings revealed a benign epidermoid, or inclusion, cyst. This is the third reported case of this type. The patient is alive and well two years postoperatively.

Comment.—Benign testicular tumors are extremely rare. Dockerty and Priestley [14] reported the first case of a pure epidermoid cyst encased within an otherwise normal testis. Gage and Brodie [15] reported the second case.

The observation that all teratomas of the testis should be regarded as malignant until proven otherwise applies also to the inclusion cysts, or dermoids. Very few of the benign testicular tumors are unidermal, as in this case. Almost all are bidermal or tridermal teratomas containing merely an excess of ectodermal structures. Carey emphasized the malignant potentialities of even the seemingly benign tumors of this type. He pointed out that some of the most fully differentiated neoplasms metastasized locally or distally, and concluded that it was dangerous to make a histological diagnosis of benign testicular tumor.

SUMMARY

The clinical aspects of testicular tumors are reviewed. Errors in diagnosis are frequent and emphasize the importance of early orchiectomy in the presence of any suspicious testicular lesion. Cases are reported illustrating difficulties in early diagnosis. A case of benign unidermal testicular tumor is discussed. This is the third such tumor to be reported. Improvement in the mortality rates depends chiefly on early orchiectomy.

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14. Dockerty, M. B., and Priestley, J. T.: Dermoid Cysts of Testis, J. Urol. **48**: 392-400 (Oct.) 1942.

15. Gage, A. A., and Brodie, E. L.: Epidermoid Cyst of Testis, J. Urol. **63**: 539-541 (March) 1950.

NITRITE AND THIOSULFATE THERAPY IN CYANIDE POISONING

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and

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In 1932 Geiger [1] began to use methylene blue in treatment of cyanide poisoning. The antidotal action of the dye was shown by Wendel [2] and Hug [3] to be due to the formation of methemoglobin, which successfully competes with the respiratory enzyme, ferricytochrome oxidase, for cyanide ions. Subsequent reports [4] indicate that methylene blue is not an efficient antidote because it is a poor methemoglobin former and at the same time reverses the reaction in presence of co-enzyme.[5] In fact, the dye is of greater value in the treatment of methemoglobinemia [6] than in cyanide poisoning. Nevertheless, the trial of methylene blue stimulated a renewed search for cyanide antidotes, and led to the discovery of a more effective therapy.

Independent investigations in Argentina [7] and the United States [4a] gave rise to a clear-cut conclusion that the combination of sodium nitrite and sodium thiosulfate, consecutively injected by vein, detoxifies cyanides to a marked degree. It was also shown that amyl nitrite, either alone [8] or with sodium thiosulfate,[9] has a similar effect. Individually, each of these simple drugs has been known for some time to have an antidotal action against cyanide poisoning. Pedigo [10] described the antagonism between amyl nitrite and hydrocyanic acid as early as 1888. Detoxification of the same poison by sodium thiosulfate was first demonstrated by Lang [11] in 1895. That sodium nitrite saved dogs poisoned with lethal doses of potassium cyanide was reported by Mladoveanu and Gheorghiu [12] in 1929. Mota [13] successfully treated a human case of cyanide poisoning with sodium nitrite alone. It is the combination of these products that constitutes an improvement of treatment.

EXPERIMENTAL RESULTS

Our own results in dogs are summarized in table 1. Chemically pure sodium cyanide was injected subcutaneously into nonanesthetized animals in various doses. Whenever an antidote was tested, it was administered promptly after the injection of the poison. Amyl nitrite was administered by inhalation, and sodium nitrite and sodium thiosulfate both intravenously. When combinations were employed, sodium nitrite was always injected first. When amyl nitrite was administered, the pearls, one at a time, were crushed in a towel and held over the dog's nose frequently while sodium thiosulfate was being

From The Lilly Research Laboratories.

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1. Geiger, J. C.: Cyanide Poisoning in San Francisco, J. A. M. A. **99**: 1944-1945 (Dec. 3) 1932; Methylene Blue Solutions in Potassium Cyanide Poisoning: Report on Cases 2 and 3, ibid. **101**: 269 (July 22) 1933.

2. Wendel, W. B.: Methylene Blue and Cyanide Poisoning, Correspondence, J. A. M. A. **100**: 1054-1055 (April 1) 1933.

3. Hug, E.: L'intoxication par l'acide cyanhydrique. Les substances méthémoglobenisantes comme antidotes de l'intoxication cyanhydrique, Compt. rend. Soc. de biol. **112**: 511-513, 1933.

injected. The treatment was repeated when signs of poisoning reappeared. The object in all experiments was to ascertain the antidotal value and not the prophylactic effect. If the computed median lethal doses (LD_{50}'s) of the cyanide as listed in table 1 are compared, it becomes obvious that the combination of sodium nitrite and sodium thiosulfate is unequivocally the best procedure, raising the median lethal dose of sodium cyanide about 18-fold. It is a definite example of potentiation of action, not merely summation. A similar potentiation is exhibited by amyl nitrite with sodium thiosulfate, although to a less extent. In a few separate experiments the poisoned dogs were allowed to stop breathing for 20 to 30 seconds after the injection of the poison, and then were treated with sodium nitrite and sodium thiosulfate injected intravenously. They all recovered within about 20 minutes.

TABLE 1.—*Comparison of Effect of Antidotes in Cyanide Poisoning in Dogs*

Antidote	No. of Dogs Used	LD_{50} of Sodium Cyanide ± Standard Error, Mg./Kg.	Ratio of LD_{50}'s of Sodium Cyanide in Treated and Untreated Dogs
None	16	5.36 ± 0.28	1
Sodium thiosulfate	11	18.4 ± 0.9	3
Amyl nitrite	13	24.5 ± 1.2	5
Sodium nitrite	13	27.1 ± 3.1	5
Amyl nitrite and sodium thiosulfate	17	60.9 ± 3.0	11
Sodium nitrite and sodium thiosulfate	21	96.7 ± 23.6	18

The mechanism of poisoning and detoxification can be best understood by the following four reactions:

$$\text{Ferricytochrome oxidase} + \text{NaCN} \rightleftarrows \text{ferricytochrome oxidase cyanide}$$

$$\text{NaNO}_2 + \text{hemoglobin} \longrightarrow \text{methemoglobin}$$

$$\text{Methemoglobin} + \text{NaCN} \longrightarrow \text{cyanmethemoglobin}$$

$$\text{Rhodanese}$$

$$\text{Na}_2\text{S}_2\text{O}_3 + \text{NaCN} + \text{O} \longrightarrow \text{NaSCN} + \text{Na}_2\text{SO}_4$$

It is well known that cyanide ions prevent the respiratory enzyme, ferricytochrome oxidase, from transporting oxygen to the cells. Fortunately the first equation is reversible as long as the heart continues to beat. The formation of methemoglobin by sodium nitrite is an actual fact, and the methemoglobin can be readily measured (chart). The successful competition for cyanide ions by methemoglobin makes the first equation proceed to the left, and restores the function of ferricytochrome oxidase.[14] The resulting compound, cyanmethemoglobin, can be demonstrated in the circulating blood of treated dogs.[15] It apparently has a low toxicity. Most of the detoxification is accomplished by conversion of the cyanide to thiocyanate under the influence of the enzyme rhodanese.[16] The steady increase of the plasma concentration of thiocyanate can be followed in treated animals, as is well illustrated in the chart. When the nitrite and sodium thiosulfate are used together, it seems that the extent of conversion is much enhanced, thus accounting for the potentiation of the antidotal action. If the amount of the cyanide present in the body is large, the initial treatment may be followed by the dissociation of cyanmethemoglobin into cyanide and methemoglobin. In addition, cyanide ions may be liberated from the thiocyanate, as recently disclosed by Goldstein and Rieders.[17] This explains the recurrence of poisoning signs and the necessity for repeating the antidotes during the course of each experiment.

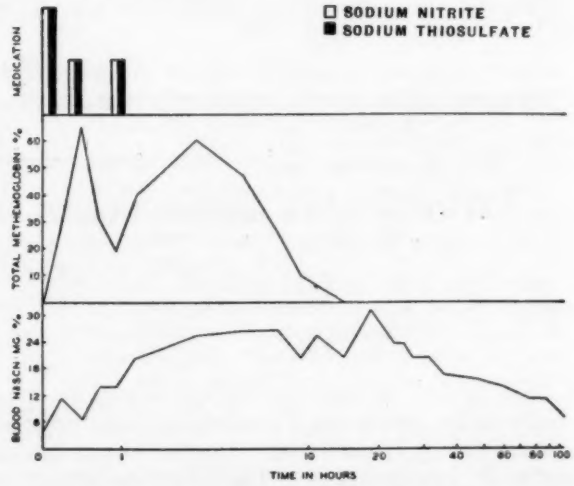

Chart showing methemoglobin and thiocyanate concentrations in the blood of a dog treated with sodium nitrite and sodium thiosulfate for acute cyanide poisoning. The dog, a female weighing 13.25 kg., was given 90 mg. of sodium cyanide per kilogram of weight subcutaneously. Immediately sodium nitrite, 22.5 mg. per kilogram, and sodium thiosulfate, 1 gm. per kilogram, were given by intravenous injections. Because of the appearance of convulsions, the treatment was repeated twice in one-half of the dose 29 and 54 minutes, respectively, after the administration of the cyanide. Methemoglobin and thiocyanate as the sodium salt (NaSCN) were measured spectrophotometrically. As shown in the curves, the methemoglobinemia reached two peaks, amounting to 65 and 60%, respectively. It disappeared in about 11 hours. The formation of sodium thiocyanate steadily increased, reaching a peak concentration of about 31 mg. per 100 cc. of blood. At the end of 103 hours the concentration of the thiocyanate remained at 7.5 mg. The dog regained consciousness two and one-half hours, and ate biscuits five hours, after the injection of the poison.

A SUGGESTED TECHNIQUE

In view of the fact that the physician may be called on unexpectedly to attend a case of cyanide poisoning which is often rapidly fatal, he should be acquainted, in principle or practice, with the following steps in treatment:

1. Break pearls of amyl nitrite, one at a time, in a handkerchief and hold the latter over the patient's nose.

2. Load a syringe with 10 cc. of a 3% solution of sodium nitrite (0.3 gm.), and another with 50 cc. of a 25% solution of sodium thiosulfate (12.5 gm.).

4. (*a*) Chen, K. K.; Rose, C. L., and Clowes, G. H. A.: Methylene Blue, Nitrites, and Sodium Thiosulphate Against Cyanide Poisoning, Proc. Soc. Exper. Biol. & Med. **31**: 250-252, 1933; Comparative Values of Several Antidotes in Cyanide Poisoning, Am. J. M. Sc. **188**: 767-781, 1934. Hanzlik, P. J., and Richardson, A. P.: Cyanide Antidotes, J. A. M. A. **102**: 1740-1745 (May 26) 1934. (*b*) Hug, E.: Methylene Blue in Cyanide Intoxication, Correspondence, ibid. **105**: 1540 (Nov. 9) 1935.

5. Bodansky, O.: Mechanism of Action of Methylene Blue in Treatment of Methemoglobinemia, Correspondence, J. A. M. A. **142**: 923 (March 25) 1950.

6. Steele, C. W., and Spink, W. W.: Methylene Blue in the Treatment of Poisonings Associated with Methemoglobinemia, New England J. Med. **208**: 1152-1153, 1933. Faucett, R. L., and Miller, H. C.: Methemoglobinemia Occurring in Infants Fed Milk Diluted with Well Water of High Nitrate Content, J. Pediat. **29**: 583-596, 1946. Tepperman, J.; Marquardt, R.; Reifenstein, G. H., and Lozner, E. L.: Methemoglobinemic Cyanosis: Report of an Epidemic Due to Corning Extract Substituted for Maple Syrup, J. A. M. A. **146**: 923-925 (July 7) 1951.

7. Hug, E.: Acción del nitrito de sodio y del hiposulfito de sodio en el tratamiento de la intoxicación provocada por el cianuro de potasio en el conejo, Rev. Soc. argent. de biol. **9**: 91-97, 1933; Asociación nitrito-hiposulfito de sodio en el tratamiento de la intoxicación cianhídrica en el perro, ibid. **9**: 197-201, 1933. Acción metahemoglobinizante "in vivo" del nitrito de sodio y del azul de metileno, ibid. **9**: 461-467, 1933. La acción combinada de varios antídotos del ácido cianhídrico, en especial del nitrito e hiposulfito de sodio, ibid. **9**: 572-577, 1933. Buzzo, A., and Carratala, R. E.: El nitrito de sodio y el hiposulfito de sodio como antídotos de la intoxicación determinada por el cianuro de potasio, Semana méd. **1**: 1224-1229, 1933; Nueva contribución al estudio de la acción del nitrito de sodio y del hiposulfito de sodio en la intoxicación determinada por el cianuro de potasio, ibid. **1**: 1966-1969, 1933.

3. Inject the solution of sodium nitrite by the median cubital vein or its substitute, and the solution of sodium thiosulfate through the same needle and vein. Discontinue amyl nitrite inhalation.

It must be realized that speed is mandatory for the treatment of cyanide poisoning. No time should be lost, even though some patients can survive for several hours without treatment. Thus amyl nitrite can be given by any person nearby after being shown the technique. The loading of the syringes can be delegated to a nurse or a qualified assistant. The diagnosis is frequently self-evident from history, but even if it is not completely established and cyanide poisoning is suspected, the recommended therapy should be administered.

If respiration has ceased but heart sounds are still audible by auscultation, artificial respiration should be instituted by the back pressure-arm lift method advocated by De Forest and Potthoff.[18] The handkerchief containing amyl nitrite should be placed next to the patient's nose, for it may hasten the resumption of respiratory movements. If the poison is taken by mouth, gastric lavage must be carried out, preferably by another physician or a nurse. The patient should be observed for 24 to 48 hours. If signs of poisoning reappear or recovery is slow, the injection of both sodium nitrite and sodium thiosulfate should be repeated in full doses.

As a matter of preparedness for the successful treatment of cyanide poisoning, kits containing the following articles may be installed in emergency wards, ambulances, and chemical laboratories: 12 pearls of amyl nitrite; 2 ampuls of sodium nitrite, 0.3 gm. in 10 cc. of water, sterilized by immersing in boiling water for 30 minutes; 2 ampuls of sodium thiosulfate, 12.5 gm. in 50 cc. of water, similarly sterilized; a 10 cc. and a 50 cc. sterile syringe; a 20-gage needle; a file; and a stomach tube.

Both sodium nitrite and sodium thiosulfate decompose in water, but they remain stable for years if some antioxidant such as sodium sulfite is added. Thus, in our laboratory a batch of ampuls of both products made on April 20, 1934, showed almost no changes by chemical assays on Dec. 18, 1951—a period of approximately 17 years and 8 months. Dry ampuls of sodium nitrite and sodium thiosulfate will serve the same purpose. They can be dissolved in water when needed. If ampuls are not available, both chemicals can be weighed out from stock bottles and made into solutions.

REPORT OF CASES

It was difficult to collect many cases of cyanide poisoning in a single locality. Accordingly, we prepared pearls of amyl nitrite, and ampuls of solution of sodium nitrite and sodium thiosulfate, and sent them on request to physicians practicing in large cities. The following case histories were furnished by them:

CASE 1.—A man, aged 24, swallowed a solution containing 2.3% of silver cyanide and 6.9% of sodium cyanide while attempting to start a siphon by mouth. Shortly thereafter he began to feel extremely weak, had a burning sensation in his throat, and felt his heart pounding. Dr. Arthur E. Joslyn, of the Joslyn Clinic, Maywood, Ill., saw the patient, took him to the clinic in his own car, and gave him intravenously 10 cc. of 3% sodium nitrite, and 50 cc. of 12.5% sodium thiosulfate. The time between the ingestion of the poison and the injection of the antidotes was 45 minutes. The patient's stomach was quickly washed out. Before the medication, generalized fine tremors were evident, and the pulse was very rapid. Recovery was obvious in three quarters of an hour; the patient complained only of a headache. He was observed for 24 hours and discharged from the clinic.

CASE 2.—Dr. C. L. Williams, Assistant Surgeon General, U. S. Public Health Service, reported to us the case of a man who was in a barracks in which fumigation with hydrocyanic acid was started at 9:45 a. m. At 10:25 a. m. the patient was noticed lying unconscious across the second story window sill, and was lowered to the ground by means of a ladder. His respiration had ceased. Artificial respiration was applied for over half an hour, and at short intervals during the following hour. Sometime between 10:25 and 11:00 a. m. an unknown amount of methylene blue was injected intravenously by a physician, and the case was considered hopeless because there was no evidence of respiration. Nevertheless the patient was given 0.3 gm. of sodium nitrite and 1 gm. of sodium thiosulfate by vein. At 12:10 p. m. the same doses of the nitrite and the thiosulfate were repeated. He responded to stimuli at 2:15 p. m., became semiconscious by 9:00 p. m., and was fully conscious the next morning. He remained in a good condition for a week, and then developed acute excitement, restlessness, and mania. Large doses of phenobarbital sodium were required to reduce his activity. The patient was bedridden for the next six days. His convalescence was slow. When he was discharged two months later, he still had mild athetoid movements of the hands and personality changes.

CASE 3.—E. R. Sasscer, Division of Foreign Plant Quarantines, United States Department of Agriculture, relayed to us the case of a man attended by Dr. Thurman A. Kinder Jr., at Matamoros, Mexico. The victim, an employee of a private concern, was accidentally poisoned with a cyanide. Details were not available. Dr. Kinder injected sodium nitrite and sodium thiosulfate intravenously, and attributed his patient's recovery to the medication.

CASE 4.—H. S. Dean, Division of Foreign Plant Quarantines, Department of Agriculture, reported to us the case of a customs inspector at Nogales, Ariz., who entered a steel boxcar loaded with 460 sacks of mung beans that had been fumigated with hydrocyanic acid the day before. He inspected the produce for customs purposes. About an hour later the switching crew passed the siding to pick up the car, and some switchmen observed the inspector lying on the sacks. Suspecting cyanide poisoning, they immediately removed him, placed him in a cabin alongside the track, and notified a doctor and the inspector in charge. The latter carried pearls of amyl nitrite with him, and administered one to the patient. The victim promptly recovered; he rested in a hospital bed for a few hours and returned to the customhouse. However, he felt weak for about a month, which was attributable to a variety of causes.

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11. Lang, S.: Über Entgiftung der Blausäure, Arch. f. exper. Path. u. Pharmakol. **36**: 75-99, 1895.

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13. Mota, M. M.: Sobre un caso de intoxicación por cianuro de potasio tratado con exito por el nitrito de sodio, Rev. méd. del Rosario **23**: 670-674, 1933.

14. Jandorf, B. J., and Bodansky, O.: Therapeutic and Prophylactic Effect of Methemoglobinemia in Inhalation Poisoning by Hydrogen Cyanide and Cyanogen Chloride, J. Indust. Hyg. & Toxicol. **28**: 125-132, 1946.

15. Mathes, K., and Gross, F.: Über den Nachweis von Methämoglobin und Cyanmethämoglobin im strömenden Blut, Arch. f. exper. Path. u. Pharmakol **191**: 706-714, 1939.

16. Lang, K.: Die Rhodanbildung im Tierkörper, Biochem. Ztschr. **259**: 243-256, 1932.

17. Goldstein, F., and Rieders, F.: Formation of Cyanide in Dog and Man Following Administration of Thiocyanate, Am. J. Physiol. **167**: 47-51, 1951.

18. De Forest, R. E., and Potthoff, C. J.: Back Pressure-Arm Lift Method for Administering Artificial Respiration Recommended, J. A. M. A. **147**: 1454-1455 (Dec. 8) 1951.

CASE 5.—Dr. D. O. Hamblin, New York City, supplied the information on this and the next four cases. A man, aged 64, was overcome by hydrocyanic acid fumes. When a nurse arrived in a few minutes, he was unconscious, cyanotic, and pulseless. His respiration had ceased, but it was restored by artificial respiration. The patient readily responded to amyl nitrite inhalation, but he had hypermotor activity for 30 to 45 minutes. An hour later he was transported to a dispensary by stretcher, where he was given 0.3 gm. of sodium nitrite and 12.5 gm. of sodium thiosulfate intravenously. Amyl nitrite inhalation was continued, along with oxygen therapy. He became conscious about two hours after exposure to the poisonous gas. He was sent home in an ambulance four hours later. Follow-up examinations revealed no abnormalities.

CASE 6.—A girl, aged 22, was suffocated by cyanogen chloride. She was discovered unconscious half an hour later, and immediately was taken to a dispensary. The patient was found unconscious and flaccid. This was followed by a period of restlessness and extreme hypermotor activity requiring restraint in bed. From 15 to 20 pearls of amyl nitrite and 0.3 gm. of sodium nitrite were simultaneously administered. Sodium thiosulfate was not given because of technical difficulties, such as the struggling of the patient and lack of light. Because of her low blood pressure, 0.25 cc. of a 1:1,000 solution of epinephrine was injected subcutaneously. Approximately three hours after exposure to the fumes the patient was transferred to a hospital, where she regained her rationality. She returned home the next day but had tenderness of abdominal, chest, and back muscles.

CASE 7.—A man, 61 years old, was overcome by hydrocyanic acid. He was unconscious, cyanotic, pulseless, and almost breathless. Twenty minutes later a nurse gave him amyl nitrite by inhalation and had artificial respiration instituted. One cc. (250 mg.) of a 25% solution of nikethamide (coramine®) was injected intramuscularly. He was carried to a dispensary and put to bed, where he regained consciousness approximately 45 minutes after being gassed. Further treatment at the dispensary consisted of administration of 0.3 gm. of sodium nitrite, 12.5 gm. of sodium thiosulfate, 0.2 cc. and 0.3 cc. of 1:1,000 epinephrine, and 0.486 gm. of caffeine and sodium benzoate. He complained of nausea, but did not vomit. His response to medication was so prompt that two hours after gassing he was anxious to drive his car home. However, he was sent home in an ambulance.

CASE 8.—A man, 67 years of age, was unconscious several minutes after exposure to hydrocyanic acid. He was pale and his pulse was weak and irregular, but respiration appeared normal. A nurse administered amyl nitrite by inhalation. He responded well, but complained of nausea and vomited once. He was observed for four hours, and then taken home.

CASE 9.—A man, aged 44, was accidentally exposed to hydrocyanic acid. He became unconscious for a few minutes. Amyl nitrite was administered from several pearls, one at a time. The patient was nauseated, vomited several times, and developed a severe headache. Since he was well oriented, he was sent home in an ambulance. A check made seven hours after gassing revealed that he felt much better, although he still complained of a mild headache, weakness, and "heart flutter." The last symptom had been noticed by the patient many times previously. Examination showed that extrasystoles were abundant, and the blood pressure was 98/58 mm. Hg.

CASE 10.—Dr. J. K. Martin of North Chicago, Ill., attended a man who was dislodging a cake of precipitate, previously treated with hydrogen cyanide, in a manufacturing still through a manhole. The worker noticed that he was quite dizzy. Shortly after, he became nauseated and vomited. This continued, with considerable retching, for approximately two hours, at which time he arrived at the first-aid station. Examination revealed nothing abnormal except incessant emesis. An ampul of 0.3 gm. of sodium nitrite, was injected into the right arm, and another of 12.5 gm. of sodium thiosulfate, into the other arm. His nausea and vomiting soon subsided. After 45 minutes' observation the patient was pronounced recovered, transferred to a hospital, and discharged in 32 hours.

CASES 11 THROUGH 16.—Six Indianapolis firemen were overcome by hydrocyanic acid when they were putting out a fire that broke out in a flour mill during fumigation. Their ages were 22, 24, 25, 26, 32, and 39 years. Because of the presence of the poisonous gas in the interior, they all wore masks, and took turns to carry the hose to the building, each for five minutes. Upon removal of the masks, they complained of the following symptoms: nausea, shortness of breath, dizziness, and coughing. They were rushed to the Indianapolis General Hospital within 30 to 40 minutes, and under the supervision of Dr. Joseph S. Bean, medical director, they were met at the entrance with amyl nitrite for inhalation. This was followed by intravenous injection of 0.3 gm. of sodium nitrite and 12.5 gm. of sodium thiosulfate. Five of the men developed headaches that were controlled by intramuscular injection of 20 mg. of methamphetamine (methedrine®). All six were discharged two to three hours after having been gassed.

CLINICAL RESULTS

The first 15 cases of cyanide poisoning in which nitrite-thiosulfate therapy was given were summarized by us [19] in 1944. Fourteen patients recovered, but one moribund patient died. Recently Wolfsie [20] reported 12 cases in industry in which treatment was successful with the same method. Miller and Toops [21] saved a man who attempted suicide with potassium cyanide by administering amyl nitrite and sodium thiosulfate. The 16 case histories given in the present communication add up to a total of 44, with 43 recoveries.

In table 2, 24 cases of cyanide poisoning are summarized, which are instructive in many respects. Their management was described in some detail by the respective authors. Twenty-two of the 24 patients were unconscious. Twelve of them showed cessation of breathing requiring artificial respiration, and four others had respiratory difficulties. Recovery of each patient must be partly attributed to the preparedness and prompt action of the medical and nursing staffs, quite aside from the efficacy of the nitrite-thiosulfate therapy. Most of them were attended within 2 to 20 minutes, but two were treated about one and one-half hours after poisoning took place, and two others, more than two hours after poisoning. This shows that cyanide poisoning is not as rapidly fatal as is usually supposed, and the prognosis is not hopeless as long as the heart continues to beat.

The cyanide agents causing poisoning listed in table 2 include hydrocyanic acid, cyanogen chloride, and sodium, potassium, calcium and silver cyanide. The most significant feature is that in cases 8, 9, and 24 the patients recovered from ingestion of 5, 2, and 6 gm. of potassium cyanide, respectively. The smallest dose of the same cyanide that had caused the death of a young woman was 0.13 gm.,[22] although another victim recovered from a quantity estimated to be between 3 and 5 gm.[23]—both without treatment. Two patients (cases 14 and 17) were probably poisoned by absorption of hydrocyanic acid through the skin (calcium cyanide slowly liberates the acid).

19. Chen, K. K.; Rose, C. L., and Clowes, G. H. A.: The Modern Treatment of Cyanide Poisoning, J. Indiana M. A. 37: 344-350, 1944.

20. Wolfsie, J. H.: Treatment of Cyanide Poisoning in Industry, A. M. A. Arch. Indust. Hyg. 4: 417-425, 1951.

21. Miller, M. H., and Toops, T. C.: Acute Cyanide Poisoning: Recovery with Sodium Thiosulfate Therapy, J. Indiana M. A. 44: 1164, 1951.

22. Bennett, C. E.: Potassic Cyanide: How Much Is a Fatal Dose, Med. Rec. 45: 742, 1894.

23. Liebowitz, D., and Schwartz, H.: Cyanide Poisoning: Report of a Case with Recovery, Am. J. Clin. Path. 18: 965-970, 1948.

In 32 of 44 cases amyl nitrite was employed as a preliminary medication. Actually, seven patients recovered with amyl nitrite alone, and two others, with a combination of amyl nitrite and sodium thiosulfate. The administration of amyl nitrite by inhalation is simple, and its importance in time of emergency cannot be overemphasized. Any person near the victim can be shown how to give it. In case 6 of the present report 15 to 20 pearls of amyl nitrite were used prior to the injection of sodium nitrite.

The dose of sodium nitrite, 0.3 gm. at a time, for intravenous injection as previously recommended [19] was conservative. This was necessary because the nitrite had caused fatal poisoning when it was accidentally ingested in huge amounts.[24] Both sodium and amyl nitrites in excessive doses induce dangerous methemoglobinemia. Bodansky [25] estimated that blood concentrations of methemoglobin of 30% or less produced no symptoms, and that lethal levels exceeded 70%. Moser [26] showed that in man an intravenous injection of 0.4 gm. of sodium nitrite resulted in a peak concentration of methemoglobin of 10.1%, and one of 0.6 gm., 17.5%. The first poisoning case of Ingegno and Franco [27] by hydrocyanic acid showed a 20% concentration of methemoglobin one and one-quarter hours after a total dose of 0.45 gm. of sodium nitrite had been injected intravenously. It is obvious that our recommended dose of nitrite is within safe limits. The fact that 43 of 44 patients recovered is indicative of its adequacy, although in six cases repeated administrations of sodium nitrite were required. One patient received 0.45 gm.; three, 0.6 gm.; a fifth, 0.75 gm.; and a sixth, 1.5 gm. The last two patients were those of Viana, Cagnoli, and Cendan; [28] they apparently sustained no serious reactions except cyanosis with the larger dose. The toxicity of sodium thiosulfate is very low. Total doses of 12.5 to 50 gm. by intravenous injection were well tolerated. Temporary fall of blood pressure may occur during the intravenous injection of sodium nitrite, but apparently it is very fleeting in duration. In the cases in which the blood pressure was recorded,[29] the readings all showed improvement as compared with those before treatment, and approached normal. In the

TABLE 2.—*Cases of Complete Recovery from Severe Cyanide Poisoning Reported in Literature*

Case	Reference	Sex	Age, Yr.	Form of Cyanide	Condition of Patient	Time Elapsed Before Therapy	
						Hr.	Min.
1	This report (case 1)	M	24	Silver cyanide and sodium cyanide	Extremely weak, burning throat, heart pounding	..	45
2	This report (case 2)	M	..	Hydrocyanic acid	Unconscious, apneic	..	50
3	This report (case 5)	M	64	Hydrocyanic acid	Unconscious, cyanotic, pulseless, apneic	..	A few
4	This report (case 6)	F	22	Cyanogen chloride	Unconscious, flaccid	..	30
5	This report (case 7)	M	61	Hydrocyanic acid	Unconscious, cyanotic, pulseless, breathless	..	20
6	This report (case 8)	M	67	Hydrocyanic acid	Unconscious, pale, weak and irregular pulse	..	Several
7	This report (case 9)	M	44	Hydrocyanic acid	Unconscious	..	A few
8	Viana and others [28]	F	..	Potassium cyanide, 5 gm.	Comatose, stertorous respiration	..	10
9	Viana and others [28]	F	..	Potassium cyanide, 2 gm.	Comatose	..	15
10	Chen and others [19]	F	34	Potassium cyanide	Unconscious, shallow respiration, imperceptible pulse	1	40
11	Ingegno and Franco [27]	M	20	Hydrocyanic acid	Unconscious, breathless, violent	2	30
12	Ingegno and Franco [27]	M	25	Potassium cyanide, mouthful of a 12% solution	Unconscious, difficulty in breathing, vomiting	2	20
13	Williams [29a]	M	..	Hydrocyanic acid	Appeared to be dead	1	30
14	Chen and others [19]	M	..	Calcium cyanide over body	Unconscious, imperceptible respiration	..	20
15	Wolfsie [20] (case 1)	M	37	Calcium cyanide	Unconscious, periods of apnea	..	2
16	Wolfsie [20] (case 3)	M	40	Hydrocyanic acid	Unconscious, apneic	..	10
17	Wolfsie [20] (case 6)	M	44	Liquid hydrocyanic acid over coat sleeve	Unconscious	..	45
18	Wolfsie [20] (case 7)	M	48	Hydrocyanic acid	Unconscious, apneic	..	13
19	Wolfsie [20] (case 8)	M	29	Calcium cyanide and hydrocyanic acid	Unconscious	..	A few
20	Wolfsie [20] (case 9)	M	40	Hydrocyanic acid	Unconscious, breathing ceased	..	A few
21	Wolfsie [20] (case 10)	M	45	Hydrocyanic acid	Unconscious, apneic	..	A few
22	Wolfsie [20] (case 11)	M	39	Hydrocyanic acid	Lying on ground, semicomatose	..	5
23	Wolfsie [20] (case 12)	M	44	Hydrocyanic acid	Unconscious, apneic	..	A few
24	Miller and Toops [21]	M	62	Potassium cyanide, 6 gm.	Unconscious, a convulsion, single gasping per 15 seconds, cyanotic, no discernible pulse or blood pressure	..	15

24. McQuiston, T. A. C.: Fatal Poisoning by Sodium Nitrite, Lancet **2**: 1153-1154, 1936. Padberg, L. R., and Martin, T.: Three Fatal Cases of Sodium Nitrite Poisoning, J. A. M. A. **113**: 1733 (Nov. 4) 1939. Greenberg, M.; Birnkrant, W. B., and Schiftner, J. J.: Outbreak of Sodium Nitrite Poisoning, Am. J. Pub. Health **35**: 1217-1220, 1945.

25. Bodansky, O.: Methemoglobinemia and Methemoglobin-Producing Compounds, Pharmacol. Rev. **3**: 144-196, 1951.

26. Moser, P.: Zur Wirkung von Nitrit auf rote Blutzellen des Menschen, Arch. f. exper. Path. u. Pharmakol. **210**: 60-70, 1950.

27. Ingegno, A. P., and Franco, S.: Cyanide Poisoning: Successful Treatment of Two Cases with Intravenous Sodium Nitrite and Sodium Thiosulfate, Indust. Med. **6**: 573-576, 1937.

28. Viana, C.; Cagnoli, H., and Cendan, J.: L'action du nitrite de sodium dans l'intoxication par les cyanures, Compt. rend. Soc. de biol. **115**: 1649-1651, 1934.

29. (*a*) Williams, C. L.: An Unusual Case of Cyanide Poisoning During Fumigation, Pub. Health Rep. **53**: 2094-2095, 1938. (*b*) Miller and Toops.[21]

combined series of 44, 7 patients subsequently developed one or all three symptoms of headaches, nausea, and vomiting. These may be attributed to the nitrite administration, and can be controlled by appropriate measures.

It is interesting that Williams' two patients experienced a period of excitement and violence after recovery from hydrocyanic acid poisoning—one being reported by himself [29a] and the other being described in this paper (case 2). The reason for this unusual complication is obscure. If cyanide ions had been liberated from thiocyanate that was formed during initial detoxification, they could have caused reappearance of symptoms of cyanide poisoning including excitement and convulsions. The work of Goldstein and Rieders [17] would support such an explanation.

TABLE 3.—*Death Rates* from Cyanide Poisoning*

	Continental United States			New York City			San Francisco	Los Angeles
Year	Suicides	Accidents	Total	Suicides	Accidents	Total	Total	Total
1918	...	..	..	8	2	10	..	..
1919	...	..	..	3	13	16	..	..
1920	...	..	..	10	8	18	..	..
1921	...	..	..	28	7	35	..	..
1922	...	..	..	10	4	14	..	..
1923	...	..	..	18	5	23	..	..
1924	...	..	..	18	4	22	..	..
1925	...	..	..	18	4	22	..	..
1926	...	..	79	13	4	17	9	12
1927	...	..	84	12	1	13	9	24
1928	...	..	108	18	8	26	8	19
1929	...	..	141	22	5	27	10	14
1930	131	3	134	34	3	37	11	18
1931	241	2	243	24	1	25	12	23
1932	374	34	408	44	5	49	21	34
1933	385	31	416	49	7	56	22	33
1934	302	21	323	30	1	31	23	25
1935	332	18	350	36	2	38	14	..
1936	267	18	285	27	0	27	7	..
1937	270	16	286	26	1	27	14	..
1938	273	10	283	26	3	29	15	..
1939	216	22	238	27	3	30	10	..
1940	197	17	214	13	0	13	12	..
1941	141	17	158	15	4	19	10	..
1942	122	13	135	23	2	25	1	..
1943	88	11	99	15	0	15	3	..
1944	83	19	102	7	1	8	3	6
1945	...	..	..	..	..	..	4	10
1946	133	14	147	13	3	16	..	8
1947	125	14	139	7	2	9	2	14
1948	102†	7†	109†	11	2	13	2	15
1949	...	..	..	9	1	10	2	10

* Data were unavailable for the years in which no figures are given.
† From 23 states only.

SOURCES AND INCIDENCE OF CYANIDE POISONING

Sodium or potassium cyanide is widely used in metallurgy for extraction of gold and silver from their ores, in electroplating, in metal cleaning, in organic synthesis, and in removing hair from hides. Hydrocyanic acid is an effective agent for the fumigation of ships, army posts, navy stations, large buildings, flour mills, private dwellings, freight cars, or airplanes that have been infested with rodents and insects. Owing to the incessant warning of manufacturers and care of handling hydrocyanic acid and its alkaline salts by numerous workers, occupational or accidental poisoning has been relatively rare. Government and health department regulations have also contributed to the safety of fumigation. The majority of deaths from cyanide poisoning have been suicidal.

Table 3 is compiled from published data [30] and those privately furnished to the authors.[31] It shows the death rates for 1926-1948 from solid cyanides in the continental United States, and from all cyanides including gaseous hydrocyanic acid for 1918-1949 in New York City, Los Angeles, and San Francisco. Whenever a separation of suicides and accidents is made, it is invariably true that the former outnumber the latter. Almost all deaths from cyanide poisoning in Los Angeles and San Francisco were attributed to suicides. As previously shown,[19] deaths from gaseous hydrocyanic acid are, on the average, more frequently accidental than suicidal, since it is usually handled by fumigators and chemists. It is interesting to observe that the number of cyanide deaths is relatively higher in the two California cities than in New York City or in the whole of the continental United States. For example, the average annual frequency in round numbers per 10,000,000 population of San Francisco was 20 during 1930-1939 based on 1930 census, and 7 during 1940-1949 based on 1940 census. By similar expression for Los Angeles it was 20 during 1930-1934, and 7 during 1944-1949; for New York City, 5 during 1930-1939, and 2 during 1940-1949; and for the continental United States, 2 during 1930-1939, and 1 during 1940-1948. As shown in table 3, death rates from cyanide poisoning have been steadily falling both nationally and in these three cities. Apparently they can be further reduced if the nitrite-thiosulfate therapy is widely employed.

During both world wars, cyanide poisoning was a subject of intensive investigation. The reports of Barcroft [32] and Bodansky [33] bear witness to the active program. It is stated that the French employed hydrocyanic acid shells in the battle of the Somme in 1916.[34] The self-destruction of Nazi leaders with potassium cyanide was also a sequel of the war. Although bitter almonds and seeds of cherry, plum, apricot, and peach may cause cyanide poisoning in man due to the presence of their cyanogenetic glycosides, its occurrence is extremely rare.

COMMENTS

The results recorded in this communication and other publications leave little doubt that patients poisoned with lethal doses of cyanide can be saved by inhalation of amyl nitrite and intravenous injection of sodium nitrite and sodium thiosulfate. Preparedness and speed of action are prerequisites of the success of treatment. The pearls of amyl nitrite and ampuls of sodium nitrite and sodium thiosulfate, wet or dry, should be therefore included in emergency kits. It is particularly fortunate that any person can learn how to administer amyl nitrite in an emer-

30. (*a*) Mortality Statistics, Bureau of Census, U. S. Department of Commerce, Washington, D. C., 1926-1933. (*b*) Gettler, A. O., and St. George, A. V.: Cyanide Poisoning, Am. J. Clin. Path. **4**: 429-437, 1934.

31. Drs. T. F. Murphy and J. C. Capt, Bureau of Census, Department of Commerce, and Dr. Halbert L. Dunn, National Office of Vital Statistics, Public Health Service, Federal Security Agency, Washington, D. C.; Dr. Thomas A. Gonzales, Chief Medical Examiner, City of New York; Dr. Jacob C. Geiger, Department of Public Health, City and County of San Francisco; and Dr. George M. Uhl, Department of Health, City of Los Angeles, supplied all the data in table 3 that have not been published previously.

32. Barcroft, J.: The Toxicity of Atmospheres Containing Hydrocyanic Acid Gas, J. Hyg. **31**: 1-34, 1931.

33. Bodansky, O.: Contributions of Medical Research in Chemical Warfare to Medicine, Science **102**: 517-521, 1945.

34. Prentiss, A. M.: Chemicals in War: A Treatise on Chemical Warfare, New York, McGraw-Hill Book Company, 1937, p. 172.

gency. The method has brought about recoveries from poisoning by hydrocyanic acid, cyanogen chloride, and the cyanides of sodium, potassium, calcium, and possibly silver. It now remains to be seen whether or not the nitrite-thiosulfate therapy will be as effective clinically as in animals against poisoning by vinyl cyanide,[35] which is used in the manufacture of synthetic rubber. In cases of mercuric cyanide poisoning, additional measures such as injections of dimercaprol (BAL) [36] to combat mercury intoxication are necessary.

In veterinary medicine deaths of livestock have occurred after the ingestion of cyanogenetic plants such as arrow grass and chokecherry.[37] Intravenous injection of sodium nitrite and sodium thiosulfate has been recommended for the revival of such poisoned animals.[38]

SUMMARY

Experiments in dogs show that amyl or sodium nitrite and sodium thiosulfate have a potentiating action in detoxifying cyanides. The mechanism depends on (1) the successful competition for cyanide ions by methemoglobin with the respiratory enzyme, ferricytochrome oxidase, and (2) the conversion of the cyanide to thiocyanate. Results of clinical trials substantiate the efficacy of the nitrite and thiosulfate therapy in cyanide poisoning. Successful treatment in 16 cases is reported. To date this method of treatment has been used in a total of 44 cases, with 43 recoveries. The mortality statistics of cyanide poisoning in the continental United States, New York City, Los Angeles and San Francisco, have been reviewed. The incidence is decreasing.

35. Dudley, H. C., and Neal, P. A.: Toxicology of Acrylonitrile (Vinyl Cyanide); Study of Acute Toxicity, J. Indust. Hyg. & Toxicol. **24**: 27-36, 1942.

36. Longcope, W. T., and Luetscher, J. A., Jr.: The Use of BAL (British Anti-Lewisite) in the Treatment of the Injurious Effects of Arsenic, Mercury, and Other Metallic Poisons, Ann. Int. Med. **31**: 545-554, 1949.

37. Couch, J. F.: Poisoning of Livestock by Plants That Produce Hydrocyanic Acid, U. S. Dept. Agriculture, Leaflet no. 88, 1934, pp. 2-4.

38. Clawson, A. B.; Bunyea, H., and Couch, J. F.: Remedies for Cyanide Poisoning in Sheep and Cattle, J. Wash. Acad. Sc. **24**: 369-385, 1934. Clawson, A. B.; Couch, J. F., and Bunyea, H.: The Toxicity of Sodium Cyanide and the Efficiency of the Nitrite-Thiosulfate as a Remedy for Poisoned Animals, ibid. **25**: 357-361, 1935. Hadley, F. B., and Kozelka, F. L.: Antidotes for Hydrocyanic Acid Poisoning, Vet. Med. **30**: 79-81, 1935.

DIAGNOSIS AND TREATMENT OF CANCER OF THE LARYNX

USE OF MEDIAN THYROTOMY, LARYNGECTOMY, IRRADIATION, AND IRRADIATION WITH SURGERY

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All surgeons who treat cancer agree that the most important consideration in its cure is early diagnosis. This applies particularly to cancer of the larynx, since the location of the larynx and the type of malignant lesion that occurs in it make it possible to cure a larger percentage of cancers in this organ than in any other part of the body except the skin. Therefore, it is essential that effort is made in all suspicious cases to secure early diagnosis by careful examination and careful study of the symptoms. The education of the laity toward recognition of the early signs and symptoms of cancer of the larynx is most important. These early symptoms are hoarseness and local discomfort. Emphasis in the lay press and on the radio on hoarseness as a possible danger signal of cancer of the larynx has made it possible for the physician to see many early cases of this type. Cancers that do not produce hoarseness as an early symptom may cause local discomfort in the patient for a long time before he consults a physician, and this form of the disease is usually first seen in a more advanced state. Lymph node involvement may be the condition that brings the patient to the physician, although he may have had local discomfort and even pain for a period of weeks or months. Therefore, local discomfort also needs to be publicized as an early symptom of this type of cancer.

DIAGNOSIS

The symptoms of pain and local discomfort can be correlated with the topology of the larynx. This correlation aids in determining the location in which these early symptoms are produced. The portion of the larynx in which the lesion produces hoarseness may be called the vocal area, and the portion that is not immediately concerned in voice production may be called the silent area. The vocal area includes the true vocal cords, the subglottic larynx, and that portion of the larynx that is described as intrinsic. The silent area includes the ventricular bands, and arytenoids, the epiglottis, and the external surface of the larynx. In cancer in the vocal area hoarseness occurs early, and metastasis occurs late. In cancer in the silent area local discomfort and metastasis occur early; therefore, if local discomfort is not recognized as an early symptom of this type of cancer, the lesion is usually far advanced when the patient is seen and frequently involves the ventricular band. These patients usually do not consult a physician until they become hoarse, and by this time lymph node metastasis has already occurred (see figure).

Fortunately, the majority of laryngeal cancers occur in the vocal area and are discovered early. Cancer of the silent area is also amenable to treatment by surgery and irradiation, and early diagnosis in this location is more important than in the vocal area, because the cancer metastasizes early. If we are to make early diagnosis of cancer of the larynx in either the silent area or the vocal area, examination must include complete visualization of the larynx by mirror examination and direct inspection, roentgenographic examination of the neck and larynx, and planographic study. Sufficient time must be spent in observation to determine accurately the presence of cancer. A fleeting mirror glance is not sufficient, even for the experienced physician, to permit an immediate

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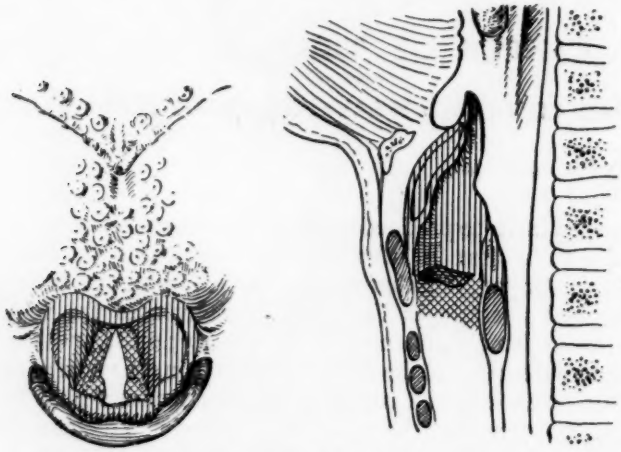
diagnosis of cancer. A correct guess could be made in a certain percentage of cases; unfortunately, however, when the affirmative guess is correct the patient usually is in an inoperable condition. The final step in diagnosis of all suspicious lesions of the larynx is direct laryngoscopic biopsy. Biopsy should be repeated and the opinion of more than one pathologist obtained if the results of the first biopsy are negative and the clinical observations cause suspicion of cancer.

TREATMENT

Surgical excision, irradiation, and, in certain cases, both are the well-established methods of treating this disease. The location and extent of the lesion determine the type of surgical procedure necessary in individual cases.

Median Thyrotomy.—The surgical procedure of median thyrotomy (laryngofissure) results in a high percentage of cure of cancers occurring in the vocal area of the larynx. In this method the lesion and its possible extensions must be excised completely in order to effect



Two views of the larynx showing vocal (cross hatched) area, in which the early symptom of cancer is hoarseness, and silent (vertical-lined) area, in which the early symptom is local discomfort.

a cure. When the silent area of the larynx is involved by the primary lesion or its extensions, total laryngectomy is required. It is fortunate, however, that at least 70% of the lesions of the larynx originate in the vocal area. Cancer in the vocal area is within the thyroid cartilage; it is well guarded from metastatic extension beyond its immediate location. Excision of the involved area, if it is surrounded by a margin of normal mucous membrane that includes the internal perichondrium, will cure a high percentage of these cases. In median thyrotomy, if the incision is extended upward and the hyoid bone is divided, the preepiglottic space can be explored, and the epiglottis itself can be removed if only the laryngeal surface is the site of the carcinoma. Two of my patients, now living, have remained free of cancer for 15 and 12 years, respectively, following removal of the epiglottis. When the localized lesion in the vocal area is more extensive, the thyroid wing on the affected side may be removed by separation of the external perichondrium. This procedure is a variation of Sir St. Clair Thomson's technique for thyrotomy. If the growth invades the anterior commissure, portions of both cords, including the internal perichondrium, may be excised. A "suspension suture," passed from within the larynx and from beneath the base of the epiglottis, and brought through the skin at the upper border of the cartilage on each side of the midline, will hold the base of the epiglottis forward so that, postoperatively, the airway will be unimpaired. For a number of years I have been using a preliminary tracheotomy as the first stage of the median thyrotomy. This permits a better knowledge of the exact location of the lesion by direct retrograde telescopic observation, and it prevents the complication of emphysema and perichondritis by placing the larynx at rest during the healing process. The use of antibiotics in thyrotomy and laryngectomy permits these procedures to be carried out with only slight morbidity and with no mortality.

Total Laryngectomy.—When the patient requires total laryngectomy because of the extent of the lesion, the important protective function of the larynx is lost, and the voice is gone. The purpose of surgical intervention, however, is to prevent recurrence, and the less extensive excision of thyrotomy should not be used in an effort to save the voice when there is need for total laryngectomy. Rehabilitation and the possibility of developing an esophageal voice following laryngectomy are excellent. In the older age group, difficulty with the esophageal voice may be experienced, and many patients prefer using an artificial larynx (electrolarynx), which produces a good voice and enables the patient to resume his place in the social and business world. In cases in which there is evidence of metastatic nodes and extensive cancer and total laryngectomy is indicated, block dissection of the affected side may be done either at the time of the laryngectomy or at a later date, as indicated in the individual case. Laryngectomy may also be required if the growth recurs in the larynx after the patient has been treated by thyrotomy.

Results of Surgical Treatment.—In a consecutive series of 761 patients with laryngeal cancer, surgical treatment was considered suitable for 437 patients. Median thyrotomy was used to treat 274 patients; total laryngectomy was used to treat 163 patients. A group of patients who had been treated during a 13 year period (1933 to 1946) was reviewed in order to make a percentage estimation of the results obtained by my present surgical technique in median thyrotomy and total laryngectomy. Of 152 patients treated by median thyrotomy, 86% were free from recurrence for five years or longer. Of 102 patients treated by laryngectomy, 61% were free from recurrence for five years or longer.

Irradiation and Irradiation with Surgery.—In a series of 324 patients in whom external surgery was not attempted, 5 patients had carcinoma in situ. These five patients were treated by local laryngoscopic removal of the cancer without external surgery, and in none was there a recurrence of cancer. A number of patients in this series refused treatment, and a considerably larger number were treated with irradiation in outside clinics. Statistics on these latter patients are not available, because follow-up was not possible; therefore, the results obtained with irradiation are known only approximately.

However, we feel justified in the conclusion that our best results with irradiation were obtained in patients over 65 years of age. In this group much less exposure to irradiation was required to produce disappearance of the growth, and less reaction in normal tissue was noted. Many cures were obtained in cases in which the cancer was located in both the silent area and the vocal area. Tracheotomy was done prior to irradiation when obstructive dyspnea was present. Many patients treated in this way had good results from decannulation after irradiation treatment. In several patients recurrence after irradiation was treated by thyrotomy in vocal area lesions and by laryngectomy where there was more extensive involvement. The results of irradiation in these cases can be reasonably evaluated as worth-while palliation, obtained in all cases, and five year cures, obtained in at least 25%. In the middle-aged group, vocal area cancer recurred after irradiation in a high percentage of the patients. One patient in whom the cancer recurred was subsequently cured by thyrotomy. Another patient whose vocal area was extremely involved by recurring cancer was cured by total laryngectomy. In both these patients the irradiation reaction had subsided completely before surgical intervention was attempted. The use of antibiotics in surgical treatment of postirradiation cases has greatly aided in obtaining favorable results.

SUMMARY

The first consideration in the cure of cancer of the larynx is early diagnosis. The publicizing of hoarseness as a danger signal of vocal area cancers has been effective in warning the public and has resulted in early diagnosis of this type of cancer for many patients. I believe that emphasis to the laity on local discomfort as an early symptom would be similarly favorable in achieving early diagnosis of silent area cancer. Surgery is the treatment of choice in selected cases of laryngeal cancer. Irradiation has proved most valuable in cancer in the older age group and in those patients whose general condition contraindicates surgery. With improvements in surgical treatment and irradiation techniques, the outlook for the patient with cancer of the larynx is excellent. Even the patient who requires a total laryngectomy can be assured of rehabilitation and a good voice, so that he can resume his place in society.

250 S. 18th St.

ADVANTAGES AND LIMITATIONS OF ULTRASONICS IN MEDICINE

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and
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High frequency sound has recently been advocated for use in physical therapy. Early clinical reports suggest that ultrasonic therapy is indicated in cases in which treatment with heat is required. Systematic evaluation of the application of ultrasound in medicine has only begun. It is certain that this radiation produces heat in the body tissues; however, whether purely mechanical or other nonthermal effects play a significant role in treatment has not been determined. This communication is restricted to the biophysical problem of the production of heat by ultrasound in tissue and the consequences of the manner in which the transformation of sound into heat takes place. It further compares this new technique with other methods of producing heat in tissue.

PHYSICAL PROPERTIES OF HIGH FREQUENCY SOUND

Sound waves, whether propagated in the air at audible frequencies or in body tissue at very high frequencies, have essentially the same character, i. e., the disturbance itself consists of alternate condensations and rarefactions within the medium. Furthermore, the condensations travel at a velocity (c) which is characteristic of the properties of the medium. In practice, sound waves of the frequencies used for therapeutic heating are generated by piezoelectric crystals or ceramics, which vibrate when subjected to an electric field. The resultant wave can be characterized by the wavelength (λ), which is defined as the physical separation between two adjacent condensations at a given instant. If the frequency of oscillations is (f), the wavelength of the sound wave is given by the relation $\lambda = c/f$. In order to produce rarefactions and condensations, individual particles constituting the medium are pulled from their equilibrium position and bunched together. This bunching process takes place f times each second. In other words, the particles of the medium oscillate as the wave passes. The displacement, velocity, and accleration of these particles under typical circumstances are shown in table 1.[1] It is important to note that the velocity of the individual particles of the medium, the particle velocity, is different in order of magnitude from the velocity of propagation of the sound waves. The latter, the velocity of sound, is a constant of the medium and independent of the sound intensity. Of particular interest are the extremely high particle accelerations and accompanying intermolecular forces that arise in the course of therapeutic treatment. These forces may become so great that temporary and irreversible physical and chemical changes are produced in the medium.

The transmission properties of a given medium are completely specified by its impedance (Z). The magnitude of this quantity is given to a good approximation

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From the Center for Instruction and Research in Physical Medicine, Graduate School of Medicine, University of Pennsylvania (Dr. Schwan), and the Moore School of Electrical Engineering, University of Pennsylvania (Mr. Carstensen).

1. Paetzold, J.: Zur Ultraschalltherapie: Die mechanischen Kraefte und der Energieumsatz im Gewebe, Ztschr. f. Phys. Therapie, Baeder-und-Klimaheilkunde 2: 1, 1949.

for a typical substance by the product of its velocity of sound (c) and density (ρ). The velocity of sound in water is approximately 1.5×10^5 cm. per second and its density, 1 gm. per cubic centimeter. Hence the magnitude of the acoustic impedance of water is 1.5×10^5 gm. per square centimeter per second. Muscle, fat, and glandular tissue all have impedances of magnitudes within 15% of that of water.[2] The impedance of quartz, a common piezoelectric crystal, is approximately 1.1×10^6 gm. per square centimeter per second—nearly 10 times that of water and tissue. The impedance of air, on the other hand, is only 40 gm. per square centimeter per second—less than 1/1000 that of water.

When a plane sound wave strikes the interface between two different mediums, a portion of the wave will be transmitted and a part reflected. The ratio of the reflected to the total energy is given by the value $(\frac{Z_1-Z_2}{Z_1+Z_2})^2$ where Z_1 and Z_2 are the impedance values on both sides of the interface. When the two impedances are equal, the reflection is zero; hence the

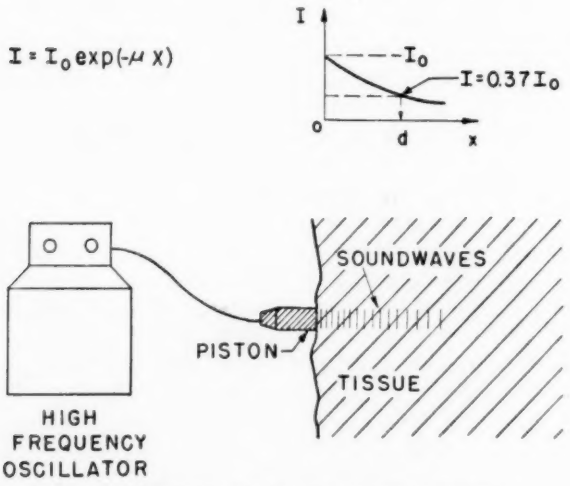

Fig. 1.—Distribution of ultrasonic energy in medium.

transmission of energy is 100%. Roughly 40% of the energy in quartz will be transferred to water or tissue, but only 0.01% from quartz to air and 0.1% from air to tissue. Thus it is apparent that an air space between the source and the tissue must be avoided if effective transfer of ultrasonic energy to the tissue is to be obtained. In sources of ultrasonic energy for medical purposes, the piezoelectric crystal with its electrodes is housed in a metal case with a diaphragm or transmission plate to provide coupling to the crystal. This unit is usually referred to as a transducer. For effective coupling, then, the transducer diaphragm must be pressed against the tissue (fig. 1). Special ointments are frequently used to guarantee an air-free contact between transducer and tissue. Water coupling, obtained by immersing both subject and transducer or by the use of special water couplers, is also satisfactory. Although somewhat less convenient than direct coupling, water coupling has the advantage that a higher ratio of internal to surface heat can be obtained, owing to the cooling effect of the water at the surface. In either method of treatment the continuous presence of a physical therapist is required.

2. Ludwig, G.: Velocity of Sound Through Tissues and Acoustic Impedance of Tissues, J. Acoust. Soc. Am. **22**: 862, 1950.

3. (*a*) Carstensen, E.: Acoustic Impedance of Human Blood, read before the Acoustical Society of America, Washington, D. C., May, 1951. (*b*) Hüter, T.: Messung der Ultraschallabsorption in tierischen Geweben und ihre Abhaengigkeit von der Frequenz, Naturwissenschaften **35**: 285, 1948.

TABLE 1.—*Dynamic Properties of a Medium Exposed to Sound**

	Equation	Order of Magnitude
Wavelength λ	$\lambda = c/f$	1 mm.
Maximum pressure (P)	$P = \sqrt{2I\rho c}$	1 atmosphere
Maximum velocity (U) of particle	$U = \frac{P}{\rho c} = \sqrt{\frac{2I}{\rho c}}$	10 cm./sec.
Maximum amplitude (A) of oscillations	$A = \frac{U}{2\pi f} = \frac{1}{2\pi f}\sqrt{\frac{2I}{\rho c}}$	1 μ
Maximum acceleration (B)	$B = U.2\pi f = 2\pi f\sqrt{\frac{2I}{\rho c}}$	100,000 g

* I, sound intensity in watts per square centimeter; f, frequency of vibrations; g, gravitation constant; ρ, density of material; and c, sound velocity. For water and water-like tissues, intensity = 1 watt/cm.^{2} and f = 1 megacycle.

As the sound wave travels through the medium a definite fraction of the energy of motion is transformed into heat in each unit of distance. More specifically, the intensity of the sound at a distance x along the path of a plane sound wave is given by the relation

$$(1)\quad I(x)=I_0\exp(-\mu x)$$

where I_0 is the intensity of the point x=0 and μ is the absorption coefficient, a constant characteristic of the medium (fig. 1). The reciprocal of μ is called the depth of penetration, the distance that the sound wave travels before being reduced to 0.37 of its original value. Table 2 gives values of the absorption for several body tissues and water. These absorption values are constants of the various mediums, independent of the intensity of the sound wave up to levels that are sufficient to produce structural changes in the mediums. The absorption in water is much lower than in any of the body tissues. Hence the water coupling previously mentioned can be used with negligible loss of energy. The absorption in muscle is about twice that in fat. This is an important advantage of ultrasonic heating over electromagnetic diathermy, where the maximum heat production is in the fatty tissues.

TABLE 2.—*Absorption Coefficient μ and Depth of Penetration $1/\mu$ for Body Tissues and Water at One Megacycle*

Substance	μ (Cm.$^{-1}$)	$1/\mu$ (Cm.)	Source
Water	0.0003	3,000	Beranek *
Plasma	0.007	130	Carstensen [3a]
Blood	0.02	50	Carstensen [3a]
Muscle	0.20-0.25	4-5	Pohlman †; Hüter [3b]
Liver	0.17	6	Hüter [3b]
Kidney	0.22	5	Hüter [3b]
Fat	0.13	8	Pohlman †

* Beranek, L.: Acoustic Measurements, New York, John Wiley & Sons, Inc., 1949, p. 76.

† Pohlman, R.: Über die Absorption des Ultraschalls im menschlichen Geweben und ihre Abhaengigkeit von der Frequenz, Phys. Ztschr. **40**: 159, 1939.

Measurements [3] have shown the absorption of sound in tissue to be very nearly a linear function of frequency. Consideration of this fact in connection with the depth

of penetration values of table 2 indicates that, for deep heating, medical ultrasonic equipment must operate at frequencies close to 1 megacycle.[4]

DIRECTIONAL VALUE OF HIGH FREQUENCY SOUND

The pattern of sound intensity in front of a vibrating crystal is rather complicated. Born [5] treats the case of the sound intensity on the axis of a circular piston. His results are shown in figure 2. The sound intensity varies through a series of maxima and minima, reaching the last maximum at a distance $x_0=R^2/\lambda$ from the piston, where R is the radius of the piston and λ is the wavelength of sound in the propagating medium. We will call the region from the piston to the position x_0 the "interference field" and that beyond x_0 the "distant field." Transition between the two regions is gradual. Figure 3 is a diagrammatic two-dimensional representation of the sound field of a piston. The energy in the interference field is confined to a parallel beam of waves whose cross section is about that of the piston. The intensity within the interference field is a complex pattern of maxima and minima both along the axis and the normal to the axis of the piston. This results from constructive and destructive interference of the individual wavelets generated at the face of the piston. The interference field of some commercial ultrasonic equipment, however, is reported [6] to have a more uniform intensity distribution than that of a simple piston source. When the piston is in direct contact with the tissue, it may be either held stationary or moved gently over the area to be treated. The latter method has the advantage that the strong intensity maxima are moved and that consequently the available power is more evenly distributed over the area to be treated. The effective dose, in watts per square centimeter, is then reduced by the ratio of the piston surface to the area of the tissue treated. Hüter [6] recommends an upper limit of 2 watts per square centimeter for stationary treatment and 6 watts per square centimeter for moving treatment.

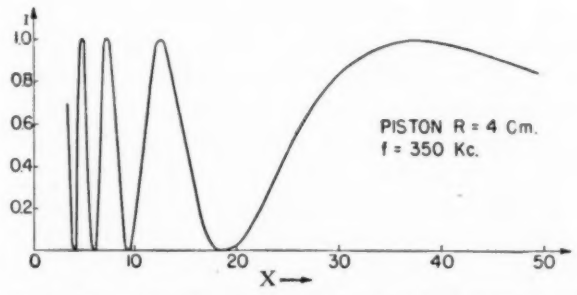

Fig. 2.—Sound intensity along the axis of a circular piston (Born [5]).

In the distant field the waves tend to diverge. The energy, however, can be said to be confined to a narrow cone of angle 2γ, where γ is given by the relation.[7]

$$(2)\quad \sin\gamma=\frac{0.6\,\lambda}{R}$$

In the distant field the intensity falls as the inverse square of the distance from the piston. It is apparent from the equation that good beaming requires small values for the ratio λ/R. The small values of λ (1.5 mm. at 1 megacycle) compared to the radius of convenient pistons (2 to 4 cm.) make beaming with ultrasound particularly simple.

PRIMARY EFFECTS OF HIGH FREQUENCY SOUND ON TISSUE

Since ultrasound is simply a mechanical vibration, its effects on biologic material must be primarily physical in nature. Thus an explanation of the ultimate biologic effects must necessarily be based on those primary physical processes that are caused by ultrasound in living matter. There are, first, the thermal effects, whose importance in the biophysical problem have been established, and, second, a number of known nonthermal effects that may or may not play a significant role under conditions of treatment.

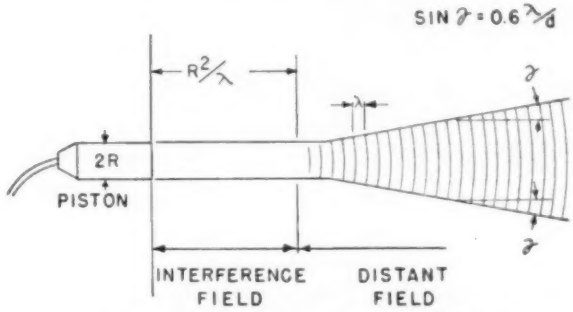

Fig. 3.—Idealized representation of sound field of piston.

The generation of heat in tissue by ultrasonic energy either may take place throughout the volume of the tissue and be accurately characterized by the absorption coefficient μ of equation 1 or may occur in a manner somewhat more complicated because of the presence of abrupt interfaces, as found in many tissues and tissue aggregates. The first phenomenon, a characteristic of completely homogenous fluids and solids, will be called "volume" heating; the second will be called "structural" heating. Volume heating arises from viscous losses, molecular processes, or elastic hysteresis. In structural heating the losses are determined by scattering, by multiple reflections, or by the generation of highly damped shear waves. This classification is, in reality, a distinction between molecular processes and those processes that occur at interfaces whose dimensions are comparable to or greater than the wavelength of the sound. From the medical viewpoint this classification is significant, in that structural absorption may under certain circumstances produce localized heating, whereas with volume absorption the heat production is more uniform.

To what extent these two classes of absorption participate in the heating of the various tissues is not as yet well known. Blood, which contains microscopic structural units in the form of the corpuscles, is perhaps the simplest example. Here the absorption of sound appears to be almost entirely of the volume type. The absorption in normal blood is nearly a factor of 100 greater than

4. The depth of penetration for muscle at 1 megacycle is approximately 5 cm. At 100 kilocycles the depth of penetration would be of the order of 50 cm., which is much higher than that needed for any treatment and hence would have an unnecessarily low rate of transmission of sound to heat energy. At 10 megacycles, on the other hand, the penetration would be approximately 0.5 cm., which is insufficient for purposes of deep heating.

5. Born, H.: Zur Frage der Absorptionsmessung im Ultraschallgebiet, Ztschr. f. Physik **120**: 383, 1943.

6. Hüter, T.: Physikalische Betrachtung zur Applikation und Dosierung von Ultraschall, Ärztl. Forsch. **3**: 585, 1949.

7. Morse, P. M.: Vibration and Sound, ed. 2, New York, McGraw-Hill Book Company, Inc., 1948, p. 328.

the absorption in water. If this is a structural effect due to the presence of blood cells, then the absorption coefficient should be in direct proportion to the concentration of erythrocytes. Instead, recent measurements,[8] summarized in table 3, show that the absorption is in direct proportion to the protein concentration and that whether the proteins are in cells or in solution makes little difference. Further measurements on cell membranes with hemoglobin removed indicate negligible absorption from these structural units.

Hüter,[3b] on the other hand, found that the absorption coefficient for tongue muscle depended on the direction of incidence of the sound relative to the orientation of the muscle fibers. He suggested that this structural absorption may arise through the action of shear processes.

In solids, including tissues, shear waves, in which the deformation is a twisting or shearing of the medium, may be propagated. Sound waves in fluids, on the other hand, are entirely compressional, i. e., the deformation of the medium consists only of condensations and rarefactions of the medium caused by motion of the particles parallel to the direction of propagation of the wave. These two waves have different velocities and absorption coefficients. The reflection of a pure compressional wave from an interface will be a complex combination of compressional and shear waves. The shear wave may be expected to decay rapidly, thus producing localized heating in the region of the interface. It is to be anticipated that this localized heating will occur wherever reflecting surfaces exist, especially at large impedance discontinuities such as muscle-bone and muscle-tendon interfaces. Nelson [9] reported temperature rises in the bones of living dogs five times the rise in surrounding tissue. This presumably is an example of structural heating. Lehmann,[10] in investigating the effect of ultrasound on the permeability of macroscopic membranes, found a selective temperature rise in the membrane.

TABLE 3.—*Absorption Coefficient for Blood and Blood Components*

Frequency, Mc./Sec.	Temperature (C.)	Substance	Protein, Gm./100 Cc.	Measured Absorption, Db./Cm.	Absorption per Gm./100 Cc., Db./Cm.
1.2	30	Plasma	5.5	0.08	0.014
		Red cells	32.0	0.40	0.013
		Hemoglobin	7.0	0.09	0.013
		Albumin	12.5	0.16	0.013
1.2	40	Plasma	5.5	0.07	0.012
		Red cells	32.0	0.34	0.011
		Hemoglobin	7.0	0.08	0.011
		Albumin	12.5	0.14	0.011
2.4	30	Plasma	5.5	0.16	0.030
		Red cells	32.0	0.94	0.029
		Hemoglobin	7.0	0.17	0.024
		Albumin	12.5	0.34	0.027
2.4	40	Plasma	5.5	0.13	0.023
		Red cells	32.0	0.77	0.024
		Hemoglobin	7.0	0.15	0.021
		Albumin	12.5	0.29	0.023

This localized heating at interfaces, characteristic of ultrasonic diathermy, has no parallel in other forms of energy therapy, such as electromagnetic diathermy or pure conduction heating. It is very important clinically to ascertain that the sound intensity at the bone is at a safe level either by properly directing the sound beam or adjusting the intensity to reduce it to a safe level by absorption in the tissues before reaching the bone.

The following nonthermal effects may or may not play a role under the conditions of therapeutic treatment:

1. *Increase of Membrane Permeability.*—Lehmann [10] reported evidence that the permeability of a macroscopic membrane under ultrasonic radiation is increased beyond that which can be explained by the heating of the membrane. He explained this by the stirring action of sound on the solution of both sides of the membrane and consequent increase in the gradient of the ion concentration near the membrane.

2. *Resonance Effects.*—Gas bubbles in liquid are known [11] to oscillate radially when subjected to a sound field. The amplitude of oscillation increases sharply when the frequency of the sound field coincides with the natural or resonant frequency of the bubble. Lehmann [12] reported observing the destruction of the erythrocytes of blood by these resonant gas bubbles in the sound field. Ackerman observed the resonant destruction of paramecia and erythrocytes of several kinds of blood,[13] which he explained on the basis of complex oscillations of the cells.

3. *High Intensities.*—High intensities of sound may produce changes of state in the medium by formation of gaseous cavities (cavitation) or breaking long-chain molecules (depolymerization). The intensities at which these and similar effects appear in biologic material is not yet known.

COMPARISON WITH OTHER FORMS OF HEAT THERAPY

With our present knowledge we are led to conclude that the effect of ultrasonic energy on tissue is primarily thermal. The value of ultrasound as a new tool of physical medicine, therefore, lies in its ability to develop heat inside the human body. The advantages and limitations of ultrasonic therapy as compared with other methods of heat application, such as surface heating and ultra high frequency diathermy, will now be discussed.

Suppose we wish to heat the volume V of tissue inside the body as it is shown in figure 4. The rise in temperature in V may be due to one or both of the following causes: (1) flow of heat by conduction from the surface that is exposed to the heat generator or (2) transformation of radiant energy (ultrasonic or electromagnetic) to heat within the volume itself. It follows from mathematical analysis [14] that the temperature rise from the first cause is roughly half the surface temperature rise if the distance from V to the surface is equal to the radius of the heated surface area. This should give a relatively high

8. Carstensen, E. L.; Schwan, H. P.; Piersol, G. M., and Pennell, R. B.: Mechanism of Absorption of Ultrasonic Energy in Blood, A. M. A. Arch. Phys. Med., to be published.

9. Nelson, P. A.; Herrick, J. F., and Krusen, F. H.: Temperatures Produced in Bone Marrow, Bone and Adjacent Tissues by Ultrasonic Diathermy: Experimental Study, Arch. Phys. Med. **31**: 687, 1950.

10. Lehmann, J.; Becker, G., and Jaenicke, W.: Über die Wirkung von Ultraschall-Wellen auf den Ionendurchtritt durch biologische Membranen als Beitrag zur Theorie des Therapeutischen Wirkungsmechanismus, Strahlentherapie **83**: 311, 1950.

11. Carstensen, E., and Foldy, L.: Propagation of Sound Through Liquid Containing Bubbles, J. Acoust. Soc. Am. **19**: 481, 1947.

12. Lehmann, J.: Beitrag zur Ultraschallhämolyse, Strahlentherapie **79**: 533, 1949.

13. Ackerman, E.: Resonant Effects of Mammalian Erythrocytes in Ultrasonic Fields, read before the Acoustical Society of America, Chicago, Oct. 10, 1951; J. Cell. & Comp. Physiol., to be published.

14. Schaefer, H., and Schwan, H.: Zur Frage der selektiven Erhitzung kleiner Teilchen im Ultrakurzwellen-Kondensatorfeld, Annalen der Phys. V **43**: 99, 1943.

depth of penetration for large contact heat sources, such as is possible with hot packs and infrared rays. But heat conduction is a relatively slow process; hence, in a living subject, the flow of blood rapidly carries away the heat. In practice, therefore, depths of penetration for infrared rays are of the order of 2 cm.[15] It follows, that to create a

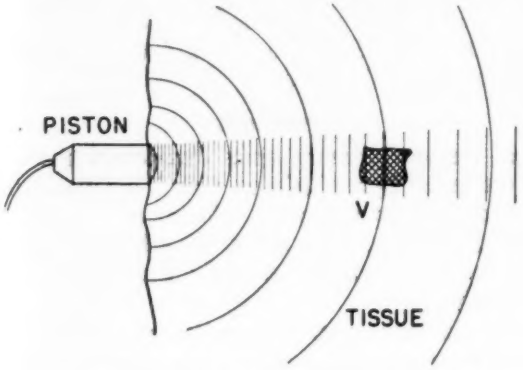

Fig. 4.—Illustration of depth penetration (see text).

temperature rise in deep tissue the heat must be produced within the tissue by absorption of radiant energy.

Deep heating with microwaves or sound waves can be considered effective only when the depth of penetration of the radiant energy is higher than the depth of penetration that is obtained simply by heat flow from the surface. Figure 5 shows the depth of penetration of electromagnetic radiation in tissue with high water content such as muscle.[16] The depth of penetration decreases with wavelength and becomes smaller than 1 cm. for wavelengths less than 10 cm. (frequencies above 3,000 megacycles). Above this frequency diathermy would offer little advantage for deep heating over infrared and other methods of surface heating. This suggests the

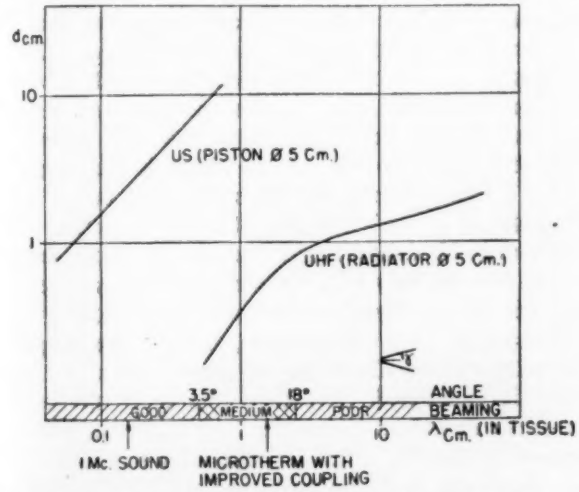

Fig. 5.—Depth of penetration and beaming for ultrasound and microwave diathermy.

use of low frequencies to provide sufficient depths of penetration. However, the ratio of heat developed in fat to that in muscle increases with decreasing frequency. Thus decreasing frequency actually leads to an effective reduction of heat in the muscle tissue. Ultrasound, on the other hand, provides adequate depths of penetration and yet has its maximum absorption in muscle.

If, in addition to generation of heat in the deep tissues, it is required that the energy be localized, ultrasound has a further superiority over electromagnetic diathermy. The relation between sharpness of beam and wavelength, discussed earlier, applies to electromagnetic as well as ultrasonic waves. The depth of penetration obtainable with various beam widths in the two instances is shown in figure 5. The wavelength scale is divided arbitrarily into three sections, "good," "medium," and "poor" beaming. A good beam is defined as one in which the energy is concentrated within an angle of 7 degrees (i. e., $\lambda < 0.1$ R); a medium beam may be up to 36 degrees (0.1 R $< \lambda < 0.5$ R); the beaming is considered poor when λ exceeds 0.5 R.

In view of the fact that an effective depth of heat penetration of several centimeters can be obtained merely with surface heating, it may be concluded that any form of energy that does not provide penetration of at least 2 cm. in tissue is not suitable for deep heating. It is obvious that, in the case of electromagnetic waves, beaming requires much shorter wavelength than permissible in the interest of penetration, but that sound offers both penetration and good beaming. The advantages and disadvantages of sound as compared with ultrahigh frequency diathermy are summarized in table 4.

TABLE 4.—*Comparison of the Characteristics of Ultrasound and Microwave Diathermy*

Ultrasound	Microwave Diathermy
Beaming good	Beaming poor
Efficient transfer of energy to tissue from source	Poor transfer of energy into tissue with present equipment
Depth of penetration good	Depth of penetration too small
Absorption in muscle greater than in fat	Heating of fat greater than muscle
Dosage determination fair	Dosage determination poor
Selective heating at interfaces	No selective heating at boundaries
Irreversible effects (cavitation) above critical energy levels	.....
Nonthermal effects possible	Pure heat therapy
Indications not well established	Indications well known

CONCLUSIONS

At present the role of nonthermal effects of high frequency sound in medicine has not been evaluated. This provides an incentive for research but is actually a deterrent to the immediate clinical application of the technique. The transfer of sound energy into heat can be due to either volume heating or structural heating; the absorption of sound in the body by the protein molecules is an example of the first; the localized heating of muscle-bone interfaces is an example of the second type.

There are both limitations and advantages in the use of the heating properties of ultrasound. Because of the coupling problem, the application of sound to tissue requires constant attention by the physical therapist. The localized heating of tissue interfaces may constitute an actual hazard unless used properly. On the other hand, ultrasound offers simultaneously high depth of penetration and good beaming. This combined with high absorption in muscle as compared with fat makes ultrasound especially suitable for localized deep heating.

15. Sweeney, F. X.; Horvath, S. M.; Mellette, H. C., and Hutt, B. K.: Infrared Heating of Tissues, Arch. Phys. Med. **31**: 493, 1950.

16. Schwan, H.: Absorption of Ultrahigh Frequency Electromagnetic Waves in Body Tissues and Its Importance for Diathermy, to be published.

SAVING TAXES THROUGH ESTATE ANALYSIS

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In my last article in THE JOURNAL [1] I gave a brief picture of the field of estate analysis and the need for sound, constructive planning. In this discussion I would like to go further and deal specifically with the large losses physicians suffer in their lifetimes and their estates suffer at their deaths, losses which are at least partially avoidable.

We are all familiar with the history of England in the last few decades in its attempts to wipe out the so-called landed gentry through a system of confiscatory taxation. It has resulted in leveling out of the economic strata so that there are few persons of great wealth, although the system has not, apparently, decreased the number of the very poor. As the Committee on Ways and Means of the House of Representatives stated in its minority report on the Revenue Act of 1951 (H. R. 4,473),[2] "We are opposed to this short sighted policy of further soaking the lower income groups tomorrow by destroying the middle and upper income brackets taxpayers today. This policy was followed with disastrous results by the Socialist Party in England and the result is that today the tax burden in England has to be shouldered by the lower income groups."

Yet that is the path of the United States in our generation. In the case of a man who leaves a two million dollar estate to his son, who in turn leaves it to his children, the estate, after deducting taxes and expenses, together with estimated shrinkage of 20%, will reach the grandchildren as approximately $335,000. Over $1,600,000 will vanish in the brief interval of the son's survival of his father, even though the son spends not $1 of the money received by him.

The income tax problem is equally acute. Since January, 1952, the physician making $14,000 a year, except in so far as his tax is modified by split-income or head of household provisions, has been in the 50% bracket. If making $50,000 he is in the 74% bracket. If $100,000, he is in the 87% bracket. For these reasons, tax savings are more important than ever today. Sound planning may easily effect a death savings of $100,000 or more to the physician's estate. It is more important to "save" than to "earn." For example, to earn enough money in one year to have $100,000 net remaining after taxes, the physician would have to receive a net income, after expenses, of approximately $590,000. There is no tax on his frugality or wisdom, however, in saving a like $100,000 by constructive foresight.

In fact, the federal government encourages the taxpayer to plan wisely. It expects the taxpayer to play fair; duplicate sets of books, false entries, unreported income, or overstatement of expenses will all produce heavy penalties and provide a shortcut to Leavenworth. But sound, honest planning is encouraged with excellent governmental cooperation. In fact, while one may not deduct as an expense the drafting of a will by a family lawyer, he may deduct the cost of most services given by a competent estate analyst. Therefore, in many cases, the government is paying half or more of the expense incurred in securing tax savings advice. The following discussion will be broken down into two primary sections, dealing with estate losses and income taxes, respectively, with appropriate subsections.

ESTATE LOSSES

There are four primary losses that reduce the value of the estate left by a physician, even if claims or debts of the decedent are eliminated. These losses are (1) estate taxes, (2) inheritance taxes, (3) administration expenses, and (4) estate shrinkage. Let us look at each of these briefly.

Estate tax computations permit an exemption of $60,000. Above that exemption, the rates start at 3%, rising to 28% at the $100,000 mark, with an ultimate top of 77%. All assets of the decedent are taxable, except for amounts left to charity. Even insurance that he has purchased on his life for his family's benefit, and joint tenancy properties, for which he paid the purchase price, are taxable in his estate. Inheritance taxes vary from state to state, and depend on the degree of relationship between the decedent and those receiving his assets. Normally, they may be considered as averaging out at around 6%. Administration expenses, again, vary from one state to another, and may depend partially on the size of the estate and the persons acting as executor and as attorney. Usually such expenses will fluctuate from as high as 15% (in a small estate) to approximately 5% in a larger estate.

It will be seen that in any substantial estate, the aggregate of these items is large, frequently taking over half the net estate. Yet there is still another factor that must be considered, and that is "estate shrinkage." This is fairly simple to explain. Everyone has heard of bargain purchases of such properties as houses and farms through estates. If they are bargains to the purchaser, they represent losses to the seller, which is the estate. A large, beautiful home, for example, may be an object of pride in a man's lifetime; it is an expensive white elephant in his estate. Farm land, during depressed economic periods, may be a white elephant; vacant residential lots almost always are frozen assets. Stock in close corporations, partnership assets, and the like frequently leave the heirs at the mercy of others, so far as liquidation is concerned. Shrinkage loss may run as high as 40%; it seldom is less than 10%. In the estate of around $500,000, which is moderately nonliquid, average shrinkage could be estimated at 18%. This would mean a loss of approximately $90,000, not counting taxes and administration expenses, to such an estate.

How can such losses be reduced? There is no simple answer to the problem of avoidance of these losses. Each estate plan must be tailor-made to fit the needs of the particular client whose problems are involved. However, certain general principles are employed with great frequency. An explanation of them may help the physician to understand the problems.

1. Appleman, J. A.: Even Physicians Die, J. A. M. A. **147**: 1547 (Dec. 15) 1951.
2. H. R. 586, 82d Congress, 1st Session.

The chief methods of reducing such losses are (1) by reducing the estate during the physician's lifetime; and (2) skipping generations or potential future taxable estates, so as to avoid like future losses to those who inherit from the physician. The ideal solution would be if all assets could be placed in a trust company, which, as owner, would pay income to successive beneficiaries, so that these persons would personally own no assets to be taxed in their estates. But the law does not permit such a solution, in toto. Various statutes prevent this result because the governmental bodies would otherwise lose such taxes and the equitable title to property would be nonvested for long intervals.

Since the ideal cannot be accomplished, as suggested, the taxable estate may be reduced by other means. Lifetime gifts to the members of one's family, including a wife, to take advantage of gross gift tax exemptions and annual exemptions may be of benefit, if used wisely. Sales of certain properties and the use of trusts may help. Take the simple matter of one's own home. If the physician and his wife hold it in joint tenancy, and he has furnished the purchase price, the entire value is taxed in his estate should he die first. If they hold it as tenants in common, only one-half is taxed in the physician's estate; if it is in her name alone, no part is taxed in his estate. This rule varies in community property states.

If the physician is a member of a medical partnership or clinic and the value of his interest is not concretely fixed by a "buy and sell" agreement, the estate may be plunged into expensive litigation. In the case of Dr. Edward Starr Judd, of the Mayo Clinic, the tax commissioner increased the valuation of his interest, as reported by the executor, by almost half a million dollars, and the resulting litigation held his estate open more than three years following his death.

It is not difficult for the physician to cut his own estate drastically during his lifetime, to establish estate liquidity, or to enter into proper partnership valuation and sale agreements. He must, however, be willing to accept expert counseling and cooperate in making effective the suggested plan. The wise use of available techniques may save tens of thousands of dollars. Following are a few illustrations, based on only one of many devices available, namely, life insurance:

1. If a physician leaves much of his property outright to his wife, a certain portion (called the marital portion) may escape taxation in his estate but it will be subject to taxation in her estate. If, however, her portion were left in the form of life insurance proceeds, payable to her during her lifetime, it would still escape taxation in his estate; in addition, however, it would be consumed during her lifetime, leaving nothing of such fund to be taxed in her estate.

2. If a physician purchases insurance on his own life, the proceeds are taxable in his estate. If his wife or children purchase insurance on him, however, and pay the premiums from their own funds, the proceeds are tax exempt. But if he gives them property to provide an income for this purpose, or money with which to pay the premium installments, it again becomes taxable. Therefore, the utmost care must be used in the selection of insurance plans.

3. His son may marry, and work for a small salary. It would be possible to make gifts to the son, but these, then, become taxable in the son's estate upon his son's death. The son needs some form of security for his family, but would be hard pressed to pay insurance premiums. In such event he would definitely have to skimp, resulting in the young people having to forego many pleasures. Grandfather, the physician, may create a trust, permitting the trustee to buy insurance on the life of the son, whereby the proceeds at the son's death may be used for the benefit of his widow and children. By this method, the amount of the premiums reduces the physician's estate; the proceeds are also not taxable in the son's estate; and a worth-while result is accomplished.

These are only a few examples of the innumerable possible methods of reducing estate losses. Usually, estate shrinkage losses may be avoided completely by wise planning; taxation and other losses may be sharply reduced. But even as "procrastination is the thief of time," delays on the part of the physician in taking steps toward a proper analysis and a sound plan make it increasingly difficult to accomplish these ends.

INCOME TAX LOSSES

One of the few good things to come out of Washington tax legislation in recent years has been the "split-income" method of income tax reporting. It helps to equalize the situation between community and noncommunity property states. But it is not a panacea. With rapidly mounting living costs and tax rates, it is increasingly difficult to establish any measure of financial security.

The principal causes of loss to physicians in this regard arise from several general errors: (1) failure to split his tax basis among sufficient persons; (2) paying on the basis of maximum revenue during highest productive years, instead of postponing tax incidents until retirement or less active years; (3) improper approach to an investment program; and (4) failure to take advantage of the benefits of gift and estate tax avenues.

APPROACH TO INCOME TAX SAVINGS

Again, the avenues for tax savings are many, so that it becomes impossible to lay down general rules for all cases. The problems are personalized ones; what is sound in one case may be suicidal in another. However, a few possibilities may serve to indicate that savings can be effected, when combined with constructive planning.

1. To reduce tax brackets, income may be divided. For example, the physician may be in a 60% bracket and his son in a 30% bracket. If the physician owns an apartment building that produces $5,000 annual net income, he pays $3,000 of this to the government. His son would pay only $1,500 in taxes. Therefore it would be better to give this income property to his son. On the other hand, it may be still better to give it to a trustee for the benefit of the son and his family, with an appropriate fiduciary return as to undisbursed income.

If the physician is paying $100 a month to support his sister, he may have to earn $240 a month in order to obtain that money. It may be better for him to purchase an annuity for her, or to buy a piece of income property

that will bring her in the necessary funds, and let her pay a very small income tax. The creation of other trusts, or the conveyance of income producing assets, may spread tax incidents among many lower bracket taxpayers.

2. Instead of thinking of investment income, one must adopt a new concept in his thinking, that is, the concept of "capital gains." It is based on the principle of "buy low and sell high." The income tax laws give a preference to the successful speculator over the wage earner. While the latter may pay as much as 89% upon his earnings, a long term capital gain will not be taxed to exceed 26%. Therefore, it is better to buy and to resell, and to repeat successfully, than to count on dividend income. In the case of deflated investments, one should time the period of their disposition to offset capital gains.

3. In the case of securities and investments that have advanced markedly in value, and particularly in the case of investors advanced in age, there is another possibility. If one is planning to make a gift to charity, it is better to give a security that has appreciated in value; no capital gains tax will probably be due, although the government is trying desperately to alter this result. Similarly, if the inflated security winds up in the decedent's estate, although it becomes subject to estate tax, no income tax is due on its increase in value prior to the decedent's death. Therefore, one planning an alteration in the portfolio of an aged client should consider the various incidents from a tax point of view in determining the retention or liquidation of each security.

4. Another new term the client must learn is that of "depreciation." Personally, I do not favor investments in rental housing property, because of constant governmental interference on behalf of the so-called downtrodden tenant. I do like sound business rental property with which the government does not meddle. Here the investor can keep his property in sound repair and charge off his expenses in this regard. He can also depreciate such property over a reasonable period of years —the shorter, the better. Thus, the depreciation items each year result in tax free income, though they reduce the cost basis of the property. However, it is better to pay on a capital gains basis of 26% on reselling the property after five or six years than to pay on a 65% basis from year to year.

5. Two other terms are "depletion" and "business losses." Uncle Sam encourages businessmen to take fliers in wildcat oil wells. It will be remembered that in my last article in this publication, I discouraged the young physician from such speculations. The practitioner who has achieved security for his family is in a different position. He has a right, then, to take a gamble, provided he uses ordinary common sense in selecting his spots for speculation and persons with whom he associates in such ventures. Assume he is in an 80% income bracket. If the well hits, he may deduct 27.5% of each royalty check as "depletion" or tax-free income and pay tax only on the remaining 72.5%, which makes a net rate, on the entire royalty, of 58% instead of the 80% applicable to other income. If he loses on his gamble, the physician may charge off his entire investment as a business loss. In other words, the government has paid four-fifths of the loss.

6. One should postpone income until lower tax years. Obviously it is better to receive more income when one's bracket is 30% than when it is 65%. One should be building for those leaner years following retirement or a partial cessation of activity. These may be illustrated in a few simple ways.

If one buys stock returning 6% upon the investment, he will have only 2% net after taxes if he is in a 65% bracket. He may, however, buy endowment insurance policies. The dividends upon them are not subject to income tax. Then, before they mature, he may elect to receive the proceeds in fixed amounts over a specified number of years. He pays no tax on these annual payments, although they include interest, until he has recovered his original cost; the remaining payments will normally fall in lower income years.

If he is a member of a clinic or multiple partnership, an important approach is to make proper deferred compensation contracts. Thus, instead of receiving $75,000 a year during periods of high productivity and paying tax on this entire amount, arrangements may be made to receive $50,000 a year during the period of his association and $25,000 a year thereafter. The organization can take out insurance payable to it to provide a fund with which to discharge these later obligations.

SUMMARY

These are only a few of the problems, and a few of the possible solutions. They do illustrate the gravity of the situation confronting any practicing physician; yet they demonstrate also that much can be done to alleviate his problems. Each situation must be handled individually. No two cases are alike; the problems of clients differ markedly. The family attorney, the friendly accountant, or the trust officer with whom one plays golf may be the finest people in the world, but they are not necessarily equipped to solve these problems. Dr. Blank may do a fine job removing tonsils; on the other hand he may know nothing of a vaginal hysterectomy. Nor would he be trained in the bombardment of a malignant tumor. The estate analyst, though he be a lawyer, may not be able to defend a criminal or to contest a boundary line dispute, but he is skilled in the problems peculiar to his field. With some thought and the assistance of specialists, the physician can accomplish great savings and add materially to his own and to his family's security. And the resulting peace of mind is invaluable.

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Methyl Alcohol Poisoning.—The clinical picture of methyl alcohol poisoning may be confused with acute surgical disease of the abdomen and with cerebrovascular accident. Acidosis should suggest methanol as a possible etiologic agent. Hyperemia of the optic disc is an extremely useful sign if present. One point that merits constant reiteration is the importance of acidosis as an indication of the severity of poisoning and necessity for prompt and vigorous alkalinization in therapy. The true significance of acidosis in methanol intoxication is unknown, but the frequent prompt subsidence of symptoms with restoration of serum bicarbonate suggests that it may be the specific metabolic derangement responsible for the intoxication.—Manuel N. Cooper, M.D.; George L. Mitchell Jr., M.D.; Ivan L. Bennett Jr., M.D., and Freeman H. Cary, M.D., Methyl Alcohol Poisoning: An Account of the 1951 Atlanta Epidemic, *Journal of the Medical Association of Georgia*, February, 1952.

CEREBRAL APOPLEXY DUE TO SPONTANEOUS INTRACRANIAL HEMORRHAGE

REPORT OF TWENTY-THREE CASES

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The mortality from the "conservative" treatment of spontaneous nontraumatic intracranial hemorrhage is discouraging to physicians who see other previously fatal conditions respond to newer techniques in surgery, to antibiotics, and to certain hormones. This type of hemorrhage may occur in the subarachnoid space, or it may originate in the cerebrum, but rarely in the subdural space.[1] Spontaneous subarachnoid hemorrhage is usually caused by a leaking or ruptured aneurysm within or contiguous to the subarachnoid space. The diagnosis and treatment of this catastrophe, at times associated with hemorrhage into the brain substance, is a problem worthy of detailed discussion [2] but is not the purpose of this paper. This presentation is primarily concerned with the results of surgical treatment of spontaneous hemorrhage into the brain substance, which in many instances causes symptoms of a "stroke."

It would be helpful to know, for comparison, what percentage of patients with proved intracerebral hemorrhage treated medically recover. However, without surgery or necropsy, verification would be impossible. One could perhaps secure such a series by cerebral angiography, which might show characteristic displacement of the cerebral vessels and thus give indirect evidence of a clot; however, the results might be the same if a tumor were present. To my knowledge, there is no report on an adequate number of cases in which cerebral angiography suggested an intracerebral hematoma, operation was not done, and the patient recovered. The alternative, therefore, is to review mortality statistics on cases of intracerebral hemorrhage that were followed clinically and verified at necropsy. Aring and Merritt have done this in 116 cases.[3] They found that 8% of the patients died within 24 hours, 41% within one to four days, 38% within five to 14 days, and 11% in two weeks to two months. Rose reported 205 cases of intracranial hemorrhage carefully studied at necropsy. Eighty per cent of the patients died within 24 hours.[4] Zimmerman analyzed the records and the necropsy material in 107 cases in which death was due to spontaneous intracerebral hemorrhage. Ninety-four per cent of the patients died during the first attack, and all were dead within five weeks of the onset.[5]

There are undoubtedly patients with intracerebral hemorrhage treated medically who show partial or complete recovery; however, they are the exception rather than the rule. Cushing in 1903 recognized the hopelessness of the expectant treatment and stated, "In spite of the unfavorable results following operations in both my cases, the temporary amelioration of the severe symptoms is a sufficient justification for future attempts to afford surgical relief to certain carefully selected cases." [6] Since Cushing's report there have been many other reports on the successful removal of these hematomas.[7]

Figure 1 lists cases of surgically treated spontaneous intracerebral hemorrhage that I found in the literature. In 19 separate reports, only three authors list more than five cases. The mortality rate varies considerably, owing to the location and rapidity of the hemorrhage; in only a few cases was hemorrhage reported in the internal capsule. In my series, approximately 50% of the hemorrhages occurred in this location.

The cause of the hematoma is frequently obscure. It is one thing to remove a clot, examine the cavity, and report what was seen at operation and another to examine at leisure the entire brain grossly and microscopically. For example, a review of the 105 cases of intracerebral hemorrhage proved at operation by others (fig. 1) reveals that the cause was not found in 95; subacute endocarditis was the cause in two; aneurysms were discovered in four; and brain tumor was seen in four. An analysis of 23 cases, in which surgery was done, reported in this paper, shows that the hematoma was caused by a rupture of an artery with no visible aneurysm in three cases; an aneurysm of the right middle cerebral artery was found in one; a brain tumor was found in two; and no obvious cause could be found in the remaining 17 cases. Robertson,[7j] who examined the brains of 93 patients who died of intracranial hemorrhage and who were given clinical diagnoses of subarachnoid hemorrhage, found aneurysms in every case; in 60% there was massive intracerebral hemorrhage associated with the subarachnoid hemorrhage. Zimmerman,[5] who sectioned the brains in 107 cases of spontaneous massive cerebral hemorrhage, found 14 cases of saccular congenital aneurysm, 8 of intracerebral tumor, 2 of cerebral arteritis (both due to subacute bacterial endocarditis), 2 of blood dyscrasia, and 81 of widespread cerebral atherosclerosis. It was Zimmerman's belief that rupture of a miliary dissecting aneurysm of an atherosclerotic cerebral artery was the pathogenesis of the apoplectic attack in 75% of the cases. Margolis and his associates recently reported that minute angiomatous malformations in the cerebrum can produce spontaneous hemorrhage.[8]

Figure 1 appears only in the author's reprints.

From the Department of Neurosurgery, Temple University Hospital and Medical School and the Jewish Hospital.

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1. Scott, M.: Spontaneous Nontraumatic Subdural Hematomas, J. A. M. A. **141**: 596 (Oct. 29) 1949.

2. Ask-Upmark, E., and Ingvar, D.: A Follow-Up Examination of 138 Cases of Subarachnoid Hemorrhage, Acta med. scandinav. **138**: 15, 1950.

3. Aring, C. D., and Merritt, H. H.: Differential Diagnosis Between Cerebral Hemorhage and Cerebral Thrombosis: A Clinical and Pathologic Study of 245 Cases, Arch. Int. Med. **56**: 435-456 (Sept.) 1935.

4. Rose, W. M.: Survival Period of Patients with Cerebral Hemorrhage Dying in Hospital, Lancet **2**: 561, 1948.

5. Zimmerman, H. M.: Cerebral Apoplexy: Mechanism and Differential Diagnosis, New York J. Med. **49**: 2153, 1949

6. Cushing, H.: Blood Pressure Reaction of Acute Cerebral Compression, Illustrated by Cases of Intracranial Hemorrhage: A Sequel to the Mütter Lecture for 1901, Am. J. M. Sc. **125**: 1017, 1903.

The presence of severe hypertension must be considered as a predisposing and important factor. Aring and Merritt stated that a systolic blood pressure greater than 200 mm. was present in 41% of their cases of cerebral hemorrhage and in only 26% of their cases of cerebral thrombosis.[3] However, they pointed out that cerebral hemorrhage or thrombosis is not rare in a patient with normal blood pressure. Of the 64 cases in which operation for intracerebral hemorrhage was done by others, in only 18, or 28%, was there a history of definite hypertension. However, in my series of 23 patients, 12, or 52%, had such a history.

The following outline lists the known causes for spontaneous intracerebral hemorrhage.

1. Aneurism of the cerebral arteries
   - A. Congenital (most common)
   - B. Atheromatous
   - C. Mycotic (infection)
2. Arteriosclerosis
   - A. Simple rupture associated with hypertension
3. Infections, weakened vessel wall (arteries and veins)
   - A. Acute and subacute
     1. Systemic
     2. Meningitis
     3. Mycotic emboli (subacute bacterial endocarditis)
     4. Exanthema (violent coughing)
     5. Thrombophlebitis of cerebral veins and dural venous sinuses
   - B. Chronic
     1. Syphilis (uncommon)
4. Blood Dyscrasia
   - A. Hemophilia
   - B. Purpura
   - C. Pernicious anemia
   - D. Polycythemia vera
5. Avitaminosis
   - A. Vitamin C (scurvy, alcoholism)
   - B. Vitamin B (Suter)
6. Varices of cerebral and dural veins
7. Eclampsia (with severe renal changes)
8. Brain tumor
   - A. Hemorrhage into primary brain tumor (glioma)
   - B. Metastatic melanotic sarcoma
9. Exogenous toxins
   - A. Antihelminthic (Aspidium filix-mas)
   - B. Chronic lead intoxication
10. Minute angiomatous malformation in cerebrum

DIFFERENTIAL DIAGNOSIS

The differential diagnosis of spontaneous intracerebral hemorrhage from cerebral thrombosis is important. The use of stellate block, heparin, or bishydroxycoumarin, as advocated by some for cerebral thrombosis or embolism, might prove disastrous in cerebral hemorrhage. Conversely, intracranial surgical intervention in cerebral thrombosis is useless except in rare instances, in which the associated cerebral edema or secondary hemorrhage produces a problem in increased intracranial pressure that is not relieved by nonoperative methods. Table 1 lists the important differential points in these conditions. Occasionally differentiation between intracerebral hemorrhage and thrombosis is extremely difficult and may be impossible without cerebral angiography.

Gross and Wechsler have advocated prompt angiography in every case of suspected intracranial hemorrhage. They believe that its value diagnostically exceeds any potential risk from the dye.[7k] The angiogram may show a characteristic displacement of the cerebral arteries, which will corroborate the diagnosis of a clot or other space-taking lesion (fig. 2). It may show an aneurysm as the source of the hemorrhage. The following case from my series illustrates the value of angiography in some cases before surgery.

A 42-year-old woman (case 17) gave a past history of mild hypertension and severe right-sided headache for two weeks. On admission the patient was drowsy. The blood pressure was 120/70, and there was homonymous hemianopsia on the left and a weakness of the left side of the face and arm. The spinal fluid was clear and of normal pressure. Roentgenograms showed a shift of the pineal gland 5 mm. to the left, corroborating a space taking lesion in the right temporofrontal area. A craniotomy was done and a large hematoma removed from the right temporal lobe. The wall of the cavity was inspected and found normal. The patient convalesced well; five days later, while sitting in a chair, she suddenly became stuporous. Immediate exploration revealed a rupture of the cortex with a massive hemorrhage into the right temporal and frontal lobe. After removal of a massive clot, a ruptured aneurysm was uncovered near the origin of the right middle cerebral artery. The bleeding was

TABLE 1.—*Differential Diagnosis*

	Intracerebral Hemorrhage	Cerebral Thrombosis
Onset	Sudden	Usually gradual
Headache	Severe and usually on side of hemorrhage	Absent or mild
Sensorium	Drowsy to coma	Usually awake
Hypertension	Approximately 50%	Approximately 25%
Eye grounds		
Retina	May show hemorrhage	No hemorrhage
Vessels	Hypertensive vascular changes	Atherosclerotic change
Disk	Normal; late choke	Normal
Spinal fluid		
Pressure	Above normal (90%)	Normal (130-160 mm. H_2O)
Color	Bloody (75)%	Normal
Pineal shift *	100%	Absent unless severe edema is present

* If gland is calcified.

7. (*a*) Russell, H. E., and Sargent, P.: Apoplectiform Cerebral Hæmorrhage: Operation: Evacuation of Blood: Slow Improvement, Proc. Roy. Soc. Med. **2**: 44, 1909. (b) Bagley, C., Jr.: Spontaneous Cerebral Hemorrhage: Discussion of 4 Types with Surgical Considerations, Arch. Neurol. & Psychiat. **27**: 1133 (May) 1932. (*c*) Penfield, W.: The Operative Treatment of Spontaneous Intracerbral Hæmorrhage, Canad. M. A. J. **28**: 369, 1933. (*d*) Craig, W. M., and Adson, A. W.: Spontaneous Intracerebral Hemorrhage: Etiology and Surgical Treatment, with Report of 9 Cases, Arch. Neurol. & Psychiat. **35**: 701 (April) 1936. (*e*) Furlow, L. T.; Carr, A. D., and Wattenberg, C.: Spontaneous Cerebral Hemorrhage: The Surgical Treatment of Selected Cases, Surgery **9**: 758, 1941. (*f*) Pilcher, C.: Subcortical Hematoma: Surgical Treatment with a Report of 8 Cases, Arch. Neurol. & Psychiat. **46**: 416 (Sept.) 1941. (*g*) Hamby, W. B.: Gross Intracerebral Hematomas: Report of 16 Surgically Treated Cases, New York J. Med. **45**: 866, 1945. (*h*) Rowbotham, G. E., and Ogilvie, A. G.: Chronic Intracerebral Hæmatoma: Their Pathology, Diagnosis, and Treatment, Brit. M. J. **1**: 146, 1945. (*i*) Scott, M.: Surgical Treatment of Spontaneous Nontraumatic (Intracerebral) Hematomas of Left Temporal Lobe, J. A. M. A. **130**: 845 (March 30) 1946. (*j*) Robertson, E. G.: Cerebral Lesions Due to Intracranial Aneurisms, Brain **72**: 150, 1949. (*k*) Wechsler, I. S., and Gross, S. W.: Arteriography in Cerebral Vascular Accidents, J. A. M. A. **139**: 502 (Feb. 19) 1949. (*l*) Sirois, J.: Cure chirurgicale des hémorrhagies cérebrales, Laval med. **15**: 457, 1950. (*m*) Grant, F. C., and Austin, G. M.: The Surgical Treatment of Spontaneous and Traumatic Intracerebral Hemorrhage, Am. J. M. Sc. **219**: 237, 1950. (*n*) Ferey, D.: The Surgical Therapy of Spontaneous Cerebral Hemorrhage, Concours méd. **72**: 1235, 1950. (*o*) Lusignan, F. W., and Cross, G. O.: Intracranial Angiography in Treatment of Cerebrovascular Accidents: Reports of Cases and A Review of the Literature, California Med. **73**: 240, 1950. (*p*) Gurdjian, E. S., and Webster, J. E.: Cerebrovascular accidents Arch. Surg. **62**: 724 (May) 1951.

8. Margolis, G.; Odom, G. L.; Bloor, B. M., and Woodhall, B.: The Role of Minute Angiomatous Malformations in the Production of Intracerebral Hematomas, read before the 19th Annual Meeting of the Harvey Cushing Neurosurgical Society, April 26, 1951, Hollywood Beach, Fla.

controlled with cautery and the use of silver clips, and the patient recovered. Follow-up two years later revealed the patient to be ambulatory; she was able to attend movies and social affairs. Her left hand was paralyzed.

If an angiogram had been done in this case, the aneurysm might have been visualized and thus suspected and clipped at the first operation.

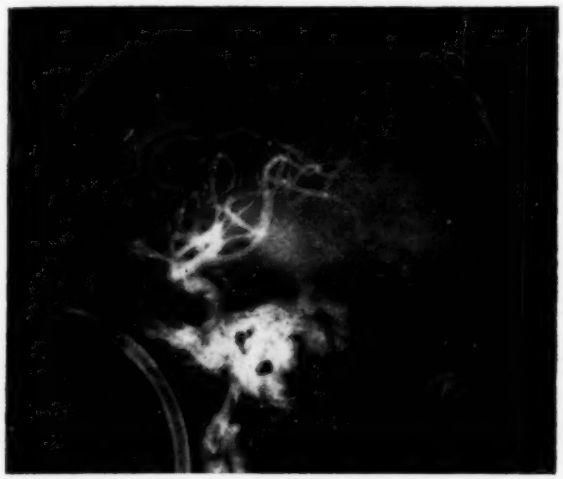

Fig. 2.—Note upward and cephalad displacement of middle cerebral (sylvian artery) due to a large hematoma in the left temporal lobe. Recovery followed removal. (Not included in my series because of a history of possible head trauma.)

The value of cerebral angiography in differentiating intracerebral hemorrhage from thrombosis can be appreciated from the following case.

A 32-year-old woman complained of intractable headaches for three weeks. Examination showed her to be drowsy, with paralysis of the left lower portion of the face and rapid paralysis

Fig. 3.—Cerebral arteriogram in a case presenting a problem in differentiation between intracerebral hemorrhage and cerebral thrombosis (see text). The arrow points to complete obstruction of the internal carotid artery in the neck, confirming the diagnosis of thrombosis.

of the left upper extremity. The blood pressure was 110/60. The spinal fluid showed a pressure of 80 mm. of water and was clear, with normal protein and no cells. The pineal gland was not visualized roentgenographically. Although cerebral thrombosis was suspected, because of the low spinal fluid pressure, the severe and persistent headache together with progressive drowsiness and monoplegia brought up the possibility of a hemorrhage in the right frontal lobe. A right cerebral angiogram showed thrombosis of the right internal carotid artery at a point 2 cm. above the bifurcation (fig. 3).

In the 105 cases of intracerebral hemorrhage proved at operation, cerebral angiography was done in only nine; in one the hemorrhage was located by the electroencephalogram, and in the majority it was located by the neurological examination. There was no reference in any of the reports to the value of a pineal shift in corroborating a space taking clot.

Although angiography is necessary in some cases, the wisdom of its routine use in spontaneous intracerebral hemorrhage remains to be proved. The knowledge gained must be balanced against the possible reaction to the dye, changes in blood-brain barrier that might lead to increased bleeding or edema, manipulation and trauma to the carotid vessel that might produce spasm or vasodilatation of cerebral vessels, and the loss of valuable time if the patient's condition shows rapid progression. Finally, one must keep in mind that an ordinary roentgenogram of the skull might show a shift of the pineal gland, which would immediately corroborate a diagnosis of hematoma as against cerebral thrombosis or embolism (see section on pineal shift).

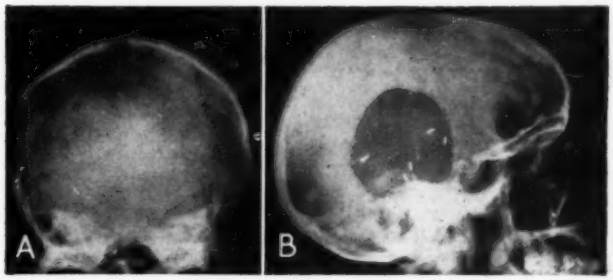

Fig. 4 (case 14).—*A*, anterposterior view. *B*, lateral view. Note enlarged trephine opening, through which the clot was evacuated, and also silver clip on ruptured artery.

I believe that cerebral angiography should be done in these cases (if the patient's condition permits) in the following situations: (1) when the clinical findings suggest aneurysm rather than hypertension, (2) if a calcified pineal gland is not seen in the roentgenograms, (3) if it is impossible to differentiate between thrombosis and hemorrhage and the patient is showing progressive symptoms, and (4) if the lesion cannot be accurately located by the neurological examination.

INDICATIONS FOR SURGERY

Most surgeons agree that operation should not be done unless there is progression in signs and intracranial pressure. One would prefer to operate on hematomas in the nondominant hemisphere, since speech is not endangered. However, there are reports in the literature of patients with motor aphasia who recovered speech after surgery. Occasionally a patient appearing hopeless can be saved.

M. C., a 25-year-old woman (case 14), was admitted in January, 1949, with a history of right-sided headaches for two days followed by sudden left-sided hemiplegia and coma. The patient had a previous history of hypertension. Examination showed decerebrate rigidity, stertorous respirations, and a systolic blood pressure fluctuating between 180 and 230. A spinal

puncture revealed bloody fluid under 260 mm. of pressure. Trephining over the right temporofrontal area was promptly done. A large clot was found and removed from the temporofrontal lobe, and the middle cerebral artery could be seen spurting in the cavity. A silver clip was applied. Follow-up over two years showed an ambulatory patient doing light housework. She was able to get about with a leg brace and cane but the left hand was useless. Her blood pressure was 140/90.

Indications for surgical intervention are outlined as follows:

1. Symptoms and signs of progressive increase in intracranial pressure:

(*a*) Loss of conscious levels to stupor or coma

(*b*) Snoring or sterterous respirations

(*c*) Progressive slowing of pulse rate (below 60) and respirations below 16

(*d*) Increased spinal fluid pressure (above 160 mm. of water)

(*e*) Choked disk if symptoms persist for days

2. Objective neurological signs of focal involvement of the brain:

(*a*) Aphasia (sensory or motor)

(*b*) Visual field cut

(*c*) Hemiplegia or hemianesthesia

(*d*) Fixed dilated pupil on one side

(*e*) Unilateral convulsions

3. Shift of the pineal gland away from the suspected cerebral hemisphere seen roentgenographically

4. Positive arteriogram showing space-taking clot or ruptured aneurysm

ANALYSIS OF CASES IN RECENT SERIES

This report deals with 23 consecutive patients operated on by me for spontaneous nontraumatic intracranial hemorrhage (table 2). Three cases reported previously,[71] in 1946, are included in this presentation. Eighteen patients had hemorrhages into the various lobes of the cerebrum. Three had hemorrhages into the subdural space. Two had massive hemorrhages into a highly vascular tumor. There were 14 men and 9 women; one patient was a Negro. The youngest patient was 25 years of age and the oldest 70. Seventy-five per cent of the patients were between 40 and 66 years of age. Twelve (52%) had a history of hypertension before onset of the cerebral accident, and in all 12 the systolic blood pressure at the time of admission was above 180. In 10 patients the systolic pressure was between 120 and 150, in four between 160 and 200, and in nine between 200 and 230.

TABLE 2.—*Analysis of Clinical and Laboratory Data in Twenty-Three*

Case No.	Age, Yr.	Sex	Duration of Symptoms	Headache †	Sensorium	Blood Pressure	Abnormal Neurological Signs
1	53	M	24 hr.	+	Drowsy	206/96	Aphasia; right hemianopsia
2	66	M	1 hr.	..	Comatose	210/104	Left hemiplegia
3	40	F	24 hr.	+	Drowsy	140/180	Aphasia; right hemiparesis
4	37	M	12 hr.	+	Drowsy	130/80	Aphasia; right hemiparesis
5	38	F	2 weeks	..	Drowsy	140/88	Choked disk; aphasia; right hemiplegia
6	60	M	?	+	Aphasic	140/99	Right hemiplegia
7	56	M	3 days	..	Drowsy	180/90	Aphasia; right hemiplegia
8	58	M	24 hr.	..	Clear	218/150	Left hemiplegia
9	47	F	4 days	+	Clear	138/78	Left homonymous hemianopsia
10	66	M	2 weeks	+	Comatose	160/80	Decerebrate rigidity
11	51	F	7 days	+	Stuporous	148/70	Left hemiparesis
12	60	M	10 days	+	Drowsy	210/140	Left hemiparesis
13	46	F	2 days	..	Stuporous	230/120	Left hemiparesis
14	25	F	2 days	+	Comatose	180/100	Decerebrate rigidity
15	26	M	2 days	+	Comatose	136/60	Decerebrate rigidity
16	50	F	24 hr.	..	Drowsy	210/110	Left hemiplegia
17	42	F	2 weeks	+	Drowsy	120/70	Left hemianopsia and hemiparesis
18	70	M	24 hr.	+	Drowsy	160/90	Left astereognosis and hemianopsia
19	53	M	2 hr.	+	Comatose	230/160	Right hemiplegia
20	40	M	2 hr.	..	Drowsy	130/90	Motor aphasia; right hemiplegia
21	57	M	48 hr.	+	Stuporous	200/110	Left hemiplegia
22	58	M	2 hr.	+	Stuporous	210/130	Left hemiplegia
23	49	F	7 days	+	Stuporous	152/100	Right hemiplegia

* Blood cell counts and urinalyses were done routinely but were not of diagnostic significance. Blood Wassermann reaction was negative in all 18
† +, present. ‡ N. C., gland not calcified. § L. C., left craniotomy; R. T., right trephining; L. T., left trephining; R. C., right craniotomy.

Headache.—Headache was present in 18, or 78%. It was bilateral in eight and localized in either side in equal numbers in 10. In all 10 the side of the headache corresponded to the side of the cerebral hemorrhage.

Nuchal Rigidity.—Nuchal rigidity was found in seven patients (all with bloody spinal fluid). It was absent in seven (three of whom had blood-tinged fluid) and not

tested for in the remaining nine. It was present, therefore, in 50% of the cases in which the test was made.

Pupillary Changes.—The pupils were equal in size in 18 cases and unequal in four. In the latter group the larger pupil did not correspond to the side of the cerebral hemorrhage in two cases.

Eye Grounds.—Eye grounds were normal in eight cases; hypertensive arteriosclerotic changes were noted in eight. Choked disk was present in only two cases, in one case three weeks after onset of hemorrhage; in the other a hemorrhage into a tumor was found.

Laboratory Studies.—A complete blood cell count and urinalysis were done in all cases. The reports were not unusual. The bleeding and clotting times were determined in 17 cases and found normal in all. The prothrombin time was determined in 11 cases; it was 30% to 35% in two cases, 50% in five, 60% in one, 70% in one, and 80% in one. The thrombocyte count was determined in 14 cases; it was below 200,000 in three. The

Cases of Surgically Treated Spontaneous Intracerebral Hemorrhage

Spinal Fluid						
Color	Pressure, Mm.	Pineal Gland ‡	Type of Operation §	Location of Hematoma	Cause	Follow-Up
Clear	130	Shift	L. C.	Left temporal lobe	?	4 yr.; working; residual right hemianopsia
Pink	290	.....	R. T.	Right internal capsule	?	Died 11 days postoperatively; no autopsy
Yellow	380	N. C.	L. C.	Left temporal lobe	?	Discharged improved; no follow-up
Pink	300	Shift	L. C.	Left temporal lobe	?	7 yr.; recovered; residual right quadrant-anopsia
Clear	480	.....	L. C.	Left frontal lobe	Tumor	Died 15 days postoperatively; metastatic chorioepithelioma
.....	180	.....	L. T.	Left subdural space	?	Died 20 days postoperatively of epidural hemorrhage
Pink	175	Shift	L. C.	Left internal capsule	?	Died 7 days postoperatively; necrosis of kidney; brain hemorrhage
.....	...	Shift	R. C.	Right internal capsule	?	4 yr.; no improvement; invalid
Pink	220	Shift	R. C.	Right temporal lobe	?	3 yr.; working; residual left homonymous hemianopsia
Pink	260	.....	L. C.	Left subdural space	Ruptured artery	3 yr.; slight residual anomia; ambulatory
Red	270	N. C.	R. C.	Right subdural space	?	3 yr.; recovered; slight improvement in vision of left eye
Clear	215	N. C.	R. T.	Right frontal lobe	?	3 yr.; recurrent attack; slight improvement
Pink	300	N. C.	R. C.	Right internal capsule	Ruptured artery	Died 4 days postoperatively; meningitis; no autopsy
Pink	260	.....	R. C.	Right temporal and frontal lobes	Lesion, middle cerebral artery	2 yr.; ambulatory
Pink	440	.....	R. T.	Right frontal lobe	Tumor	Died 3 mo. after reoperation for metastatic melanoma
Pink	300	N. C.	R. T.	Right frontal lobe	?	Died 2 yr. later in another hospital of recurrent hemorrhage
Clear	160	Shift	R. C.	Right temporal lobe	Aneurysm in circle of Willis	2 yr.; ambulatory
.....	...	Shift	R. C.	Right temporal lobe	Cardiac; embolic	7 mo.; recovered, then died of a coronary attack
Red	230	N. C.	L. C.	Left internal capsule	?	Died 3 days postoperatively; no autopsy
Clear	180	N. C.	L. T.	Left frontal lobe	?	1 yr.; still aphasic; leg improved
Pink	400	N. C.	R. T.	Right internal capsule	?	6 mo.; recovery; left lower extremity
Red	250	N. C.	R. T.	Right internal capsule and ventricle	?	5 mo.; no improvement
Red	?	.....	L. T.	Left internal capsule	?	Died 3 days postoperatively of edema and hemorrhage

patients tested. Bleeding and coagulation times were normal in all 17 patients tested.

State of Sensorium on Admission.—Three patients were alert, 11 were drowsy, 4 were in stupor, and 5 were comatose on admission. Four of the eight deaths in the entire group occurred in those cases in which stupor or coma was present.

Abnormal Neurological Signs.—All 23 patients had neurological signs that permitted location of the cerebral hemisphere involved. These signs varied from a dilated pupil to complete hemiplegia. Seventeen patients had paralysis of one side of the body (nine on the right and eight on the left). Five of these had an associated motor aphasia, two had a mixed aphasia, and two had an associated reduction in the visual field. Three patients had decerebrate rigidity. One patient had a homonymous field defect only, another a mixed aphasia with homonymous cut, and another had astereognosis with homonymous field defect (table 3).

blood Wassermann reaction was negative in all 18 cases in which the test was made.

Spinal Fluid: The spinal fluid pressure was recorded in 20 cases. It was above normal (160 mm. of water) in 18 (90%). The two highest pressures, 480 mm. and 440 mm., were found in the two cases of brain tumor associated with hemorrhage. The average pressure, excluding the cases of brain tumor, was 238 mm. of water. The spinal fluid was examined for red cells in 19 cases. It was reported to be clear in 5 cases, pink in 10, and cherry red in 4. Thus, the spinal fluid was bloody in 14 out of 19 cases (73%).

The Wassermann reaction of the spinal fluid was negative in the nine cases in which the test was made.

Pineal Shift.—Roentgenograms of the skull were taken before operation in 16 cases. In eight (50%) the pineal gland was not calcified. In the remaining eight (50%), it was calcified and a definite pineal shift was found, which permitted location of the side of the intracerebral hemorrhage. Thus, in 100% of cases in which the pineal gland was visualized, a definite diagnosis of the presence any location of a space taking mass could be made.

Type of Operation.—An exploratory craniotomy was done in 14 cases and an enlarged trephine opening made in nine. Reexploration was done in two cases of brain tumor, in case 6 three days after the original operation and in case 15 three months after the original operation. Death occurred in both cases, and autopsy showed extensive metastasis. Reexplorations were done in five of the remaining 21 cases (cases 9, 14, 16, 17, and 21). In case 9 another operation was performed one and a half

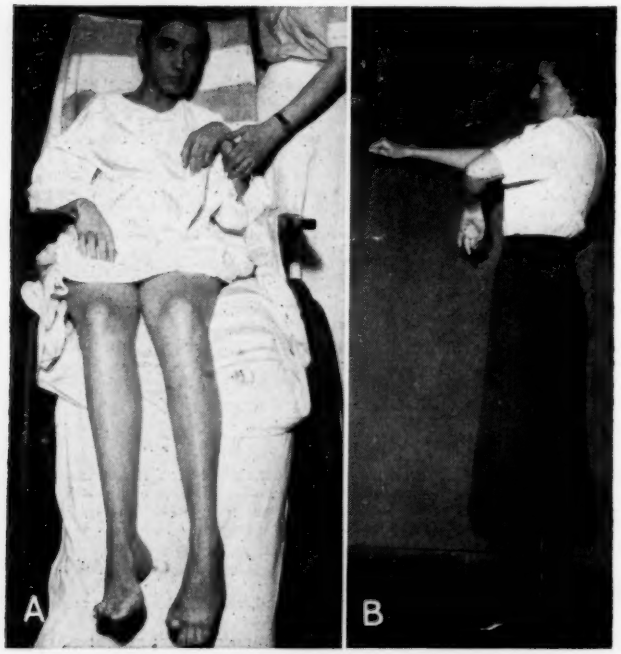

Fig. 5 (case 14).—*A*, six weeks after operation. *B*, two years after operation (see text).

years later, because of a tight decompression and headaches. A porencephalous dilatation of the ventricle in the region of the previous clot cavity was found, with no recurrence of the clot. Examination made one year later revealed that the patient was comfortable and was working; the only residual sign was left homonymous hemianopsia (fig. 6).

One patient (case 4) was reoperated on six days after the first operation, and a small amount of old liquid blood was drained from the subdural space. This patient recovered and is walking with a brace and cane. One patient (case 16) was operated on three times. At the first operation liquid blood was evacuated from the right internal capsule. At the second operation, 11 days later, a solid clot was evacuated and a subtemporal decompression was done. Two weeks later, the incision was reopened but no recurrence was found. There was no improvement in the paralysis. The patient died two years later from a recurrent hemorrhage.

Case 17 suggests the importance of preoperative arteriography (see differential diagnosis). In case 21, reoperation 18 hours after the first operation was done because of recurring stupor. A bleeding artery from the inner scalp layer was found. There was no recurrent clot within the tumor cavity. The patient's paralysis is improving.

Gross Findings at Operation.—Liquid blood was aspirated in four cases; solid large hematomas were found in the remaining 19 (including two cases of tumor). In five cases involving the temporal lobe, the clot cavity

TABLE 3.—*Summary of Clinical Findings in Twenty-Three Cases of Spontaneous Intracranial Hemorrhage*

Clinical Findings		No. of Cases	%
Hypertension		12	52
Headache		18	78
Bilateral	8		
Unilateral	10 (R, 5; L, 5)		
Sensorium			
Awake		3	13
Drowsy		11	48
Stuporous or comatose		9	39
Pupils equal		18	78
Pupils unequal		4	17
Choked disk		2	9
Visual field defect		4	17
Motor aphasia		4	17
Mixed aphasia		3	13
Hemiparesis		5	22
Hemiplegia		12	52
Decerebrate rigidity		3	13
Blood Wassermann neg.		18	100
Spinal fluid			
Pressure elevated		18	90
Red cells		14	73
Wassermann neg.		9	100 *
Calcified pineal		8	..
Pineal shift		8	100 †

* The Wassermann reaction was negative in 100% of the cases in which the test was made.

† X-rays were made in 16 cases, and pineal shift was present in 100% of cases in which the gland was visualized.

TABLE 4.—*Portion of Brain Involved*

		No. of Cases
Frontal lobe		13
Left frontal	4 (4 in internal capsule)	
Right frontal	9 (5 in internal capsule)	
Temporal lobe		6
Left temporal	3	
Right temporal	3	
Right temporofrontal		1
Subdural space		3
Left subdural	2	
Right subdural	1	
Total		23

encroached on the almost paper-thin lateral wall of the ventricle. The right hemisphere was involved in 13 cases and the left in 10 cases.

Microscopic Examination of Blood Clot and Wall of Cavity.—A biopsy of the hematoma and cavity wall was made in 22 of the 23 cases. In two cases (5 and 15), chorioepithelioma and malignant melanoma were reported as the source of the hemorrhage. In the remaining cases the diagnosis was blood clot with or without inflammatory cells; in a few, arteriosclerotic as well as endarteritic changes were reported. It was the pathologist's impression that the inflammatory changes were the result of the hemorrhage, and not the cause of it.

Causes of Hemorrhage.—The hematoma was caused by a rupture of an artery with no visible aneurysm in three cases. An aneurysm of the right middle cerebral artery was found in one case. A brain tumor was the cause in two cases (chorioepithelioma and malignant melanoma). No obvious cause for the hemorrhage was found at operation in the remaining 17 cases.

Mortality.—Eight patients died in the hospital after operation. The mortality following operation was 35% for the entire group. The mortality drops to 28% if the two cases of brain tumor are excluded. It should be noted that all the patients with intracerebral hematoma except three (case 6 and the two cases of tumor) who died after operation were stuporous or comatose or had elevated blood pressure when admitted.

Follow-up.—Fifteen patients recovered from their acute episode and were discharged from the hospital (table 2). Five patients are working, four regularly and one part time. Five patients show no marked improvement in paralysis and are invalids. Two patients are ambulatory, do light housework, and attend movies and social functions. The involved hand in each case is useless. Two patients died (one from another attack two and a half years later and the other from coronary artery thrombosis seven months later). One patient could not be located.

SUMMARY

Twenty-three consecutive cases of surgically treated spontaneous nontraumatic intracranial hemorrhage are reported. The hemorrhage occurred into various lobes of the brain in 20 cases and into the subdural space in three. The hemorrhages occurred in the internal capsule in nine cases. The youngest patient was 25 years of age and the oldest 70. Seventy-five per cent were between 40 and 66 years of age. Twelve (52% had a history of hypertension before onset of cerebral accident. Headache occurred in 78%. It always corresponded to the side of cerebral hemorrhage when unilateral. Nuchal rigidity was present in 50%. Only three patients were alert on admission; 11 were drowsy; nine were in stupor or coma. All patients had neurological signs that permitted accurate location in the involved cerebral hemispheres.

Routine blood cell count, urinalysis, Wassermann reaction, bleeding and clotting times, prothrombin time, and thrombocyte count gave no clue as to the cause.

The spinal fluid pressure was above normal in 90% of the cases; the fluid was blood-tinged or red in 73%. In 100% of the cases in which the pineal gland was visualized by roentgenograms (eight cases), it was displaced and permitted a definite diagnosis of the presence and location of a space taking clot (due to tumor in two cases). Air studies or angiograms were not necessary for location in this series.

An exploratory craniotomy was done in 14 cases and a large trephine opening made in nine. Reexplorations were done for various reasons in 7 of the 23 cases. Liquid clot was found in four cases; solid clots were found in remaining 19 (including two cases of brain tumor). Portions of the brain were involved in the following frequency: frontal, 13 (9, internal capsule); temporal, 6; right temporofrontal, 1; and subdural space, 3. Biopsy of hematoma and cavity wall or membrane was made in 22 of 23 cases. An aneurysm was found in one case; rupture of an artery with no visable aneurysm was found in 3; brain tumor was found in two; no obvious cause for hemorrhage was found in the remaining 17 cases. Eight patients died in the hospital after operation (mortality 35%; if two cases of brain tumor are excluded the mortality is 28%). Fifteen patients recovered from the acute episode and were discharged from the hospital.

CONCLUSIONS

1. Spontaneous intracerebral hemorrhage produces symptoms and signs of a focal expanding lesion and is associated in the majority of cases with bloody spinal fluid under increased pressure.

2. This condition must be differentiated from cerebral thrombosis or embolism, because the treatment of the latter with stellate block or anticoagulants might prove disastrous if used in the treatment of cerebral hemorrhage.

Fig. 6 (case 9).—Three years after removal of a hematoma from the right temporal lobe, the patient was working regularly. She had residual left homonymous hemianopsia.

3. Any person, regardless of age, experiencing sudden headache associated with focal signs such as aphasia, visual field defect, anesthesia, or hemiplegia and progressive drowiness or stupor should be considered to have a space taking lesion, possibly intracerebral hematoma.

4. The following steps should be taken promptly: (*a*) careful history and neurological examination, (*b*) examination of the eye grounds, (*c*) careful spinal puncture to determine pressure and slow removal of 3 cc. of fluid in a search for evidence of bleeding, and (*d*) steroscopic x-rays of skull for determination of pineal shift.

5. Cerebral angiography is not essential as a routine procedure, and its use is not without risk. The diagnosis

and location of the clot was established in every case in this series without it. Valuable time may be lost and operation unduly delayed. I believe that it should be used in the following circumstances if the patient's condition is not critical: (*a*) when the clinical findings suggest aneurysm rather than hypertension as a factor, (*b*) if the lesion cannot be accurately located by the neurological examination, (*c*) if a calcified pineal gland is not seen on plain roentgenograms of the skull, and (*d*) if it is impossible to differentiate between thrombosis and hemorrhage and the patient is showing progression in symptoms.

6. Although occasionally patients with intracerebral hemorrhage recover spontaneously, the majority show progression in focal signs and increased intracranial pressure. Prompt diagnosis and surgical intervention in this group will save lives.

ADDENDUM

Since this paper was written, seven additional patients have been operated on (one by my associate, Dr. Frederick Murtagh). Four of the lesions were in the internal capsule; two were in the temporofrontal lobe; and one was in the left parietal lobe. There were two postoperative deaths. Five patients recovered after surgery, two with excellent function, one with residual hemiplegia, and one with persistent decerebrate rigidity. One patient was recovering satisfactorily but died suddenly four months later from another hemorrhage.

225 S. 17th St.

CLINICAL NOTES

MACROGLOSSIA AS A MANIFESTATION OF PRIMARY SYSTEMIC AMYLOIDOSIS

REPORT OF A CASE

William G. Ensign, M.D., Minot, N. D.

Macroglossia is an unusual and striking clinical finding. The number of listed causes is relatively few, and the diseases associated with it are for the most part infrequently encountered. Among the listed causes are primary systemic amyloidosis, myxedema, acromegaly, glycogenosis (von Gierke's disease of muscle),[1] advanced tertiary syphilis, and congenital anomaly.[2] The congenital type of macroglossia is further divided into two types, lymphangiomatous and muscular. Most authors, in describing amyloidosis, have followed the classification of Reimann, Koucky, and Eklund.[3] They have divided amyloidosis into four clinicopathological groups: (1) primary amyloidosis, (2) secondary amyloidosis, (3) tumor forming amyloidosis, and (4) amyloidosis associated with multiple myeloma.

Secondary amyloidosis, which is associated with various chronic diseases, is relatively common and well known, whereas primary amyloidosis is rare. Up to 1950 there had been reported in the literature approximately 70 cases. Primary amyloidosis is characterized by (1) absence of preceding disease; (2) no involvement of organs or tissues usually affected in the secondary form, such as the liver and spleen; (3) involvement of mesodermal tissue, the cardiovascular system, the gastrointestinal tract, smooth and striated muscle, and lymph nodes; (4) variation in staining reactions; and (5) a tendency to nodular deposits.[3] The tumor forming type is very similar to the primary form. The primary form has appeared only during the later decades of life, and its sex distribution is about equal. The genesis of this disease is unknown, and there is no known treatment.

A correct clinical diagnosis of primary systemic amyloidosis is seldom made. According to Ballinger,[4] of the 46 cases in which postmortem examination was made and which were reported in the literature, in only 8 was the diagnosis made clinically. The appearance of macroglossia is one of the few manifestations on the basis of which a clinical diagnosis can be made. Diagnosis has also been made by biopsy of skin, mucous membrane, and muscle. In the case reported herein, the presenting symptom was a painless, diffuse, symmetrical enlargement of the tongue. A clinical diagnosis of primary systemic amyloidosis was made on this basis and later proved at autopsy.

REPORT OF A CASE

H. L., a 72-year-old retired farmer, was first seen on April 27, 1951, complaining of a "big tongue," which he had first noticed approximately one year previously. The right arm had been amputated in a sawmill accident when the patient was in his early twenties. In 1938, a right inguinal herniorrhaphy was performed.

The enlargement of the tongue was not accompanied by pain, foul breath or taste, burning, or change in salivation. During the few months before examination, the enlargement had progressed to a point where speech became difficult, and the patient was unable to keep his dentures in position. He also complained of bilateral deafness, of many years' duration, which had become progressively worse in the four days prior to examination. For the previous five to six years, he had had intermittent, dull, generalized pain in the left wrist and hand. On a few occasions during the preceding year, he had noted small amounts of fresh blood with bowel movements.

Physical examination revealed a well-developed, well-nourished, old man who did not appear to be ill or in distress. His speech was slow, and most words were poorly enunciated. The temperature was 99 F, pulse rate 84, and respirations 20. The blood pressure was 192 systolic and 100 diastolic. The skin was clear throughout. The eyes, nose, neck, and lymph nodes were normal. There was a large amount of impacted cerumen in both external ear canals. The patient was completely edentulous. There was a symmetrical enlargement of the entire tongue to approximately double an average-sized tongue. Although the tongue was pale, there were no gross changes of the mucous membrane. All tongue motions were present but were performed with difficulty. The lungs were clear to auscultation and percussion. The heart was normal to palpation. The left border of cardiac dulness was 10.0 cm. from the midline in the fifth intercostal space. The rhythm was regular, and the sounds were

From the Department of Medicine, Northwest Clinic.

1. Clement, D. H., and Godman, G. C.: Glycogen Disease Resembling Mongolism, Cretinism, and Amyotonia Congenita: Case Report and Review of Literature, J. Pediat. **36**: 11-30, 1950.

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3. Reimann, H. A.; Koucky, R. F., and Eklund, C. M.: Primary Amyloidosis Limited to Tissue of Mesodermal Origin, Am. J. Path. **11**: 977-988, 1935.

4. Ballinger, J.: Amyloid Heart Disease, Am. J. M. Sc. **217**: 308-313, 1949.

of good quality. There was no gallop or friction rub. There were no murmurs. Palpation revealed a moderate amount of arteriosclerosis in the peripheral arteries. There was no peripheral edema. Aside from a right inguinal surgical scar, the abdomen was normal. Rectal examination disclosed nothing unusual. The prostate was essentially normal. Examination of the extremities showed an amputation of the right arm above the elbow and a moderate amount of hypertrophic changes of all finger joints of the left hand. The deep reflexes were active and equal throughout.

The red blood cell count was 3,600,000, hemoglobin 76%, and the white blood cell count 8,300, with 68% neutrophils, 25% lymphocytes, 6% eosinophils, and 1% basophils. The serologic reaction of the blood was negative. Urinalysis showed a specific gravity of 1.015, pH of 5.0, 60 mg. of albumin per 100 cc., no sugar, 0 to 1 white blood cell, 10 to 15 red blood cells, and a rare coarsely granular cast. The coagulation time was 4 minutes 10 seconds. A congo red test was performed intravenously, which revealed 83% of the injected dye remaining in the plasma after one hour. An electrocardiograph showed sinus rhythm, left axis deviation, and a deep Q wave in lead AVF, which suggested posterior myocardial damage. An x-ray of the chest showed thickened pleura at the base of the right lung. An x-ray of the left hand revealed a moderate amount of degenerative arthritis of the interphalangeal joints. Basal metabolic rates were reported as +26% and +34%. The accuracy of these basal metabolic rates was in doubt, as the mouth piece could not easily be maintained in proper position. An audiogram revealed evidence of bilateral nerve deafness.

The patient was hospitalized. On his fifth hospital day the margins of the tongue were resected for relief of his symptoms and for biopsy. The incision was closed with 14 interrupted black silk sutures. The patient suddenly became cyanotic at the completion of the operation and died shortly thereafter.

Autopsy.—A postmortem examination was made three hours after death by Dr. Paul J. Breslich. There was slight pitting edema of the lower extremities. Examination of the abdominal cavity revealed loops of small and large intestine moderately distended with gas. The appendix vermiformis was normal. There was moderate enlargement of the spleen. The inferior margin of the liver was 6 cm. below the xiphoid process of the sternum in the midline, and the superior margin was 6 cm. above the costal margin in the right anterior axillary line.

Both lungs were hugely distended with air. The lower third of the right pleural cavity was obliterated by dense fibrous adhesions. The right lung weighed 1,000 gm. and the left 820 gm. On section, the lung parenchyma contained a large amount of frothy, blood-stained fluid. No gross changes were noted in the veins of the thorax, thoracic duct, trachea, main bronchi, or large pulmonary vessels.

The heart weighed 450 gm. The transverse diameter of the heart measured along the upper surface of the diaphragm was 15 cm. The endocardium of the right auricle, right auricular appendage, and right ventricle showed no changes. The tricuspid and pulmonic valve leaflets were unchanged. The endocardium of the left auricle was markedly thickened by fibrous scar. There was a moderate amount of scar tissue on the posterior wall of the left ventricle and a rather large amount in the ventricular septum. There was no noteworthy change of the mitral or aortic valves.

The myocardium was studded extensively with slightly elevated, white nodules, resembling the cut ends of thickened blood vessels. These nodules measured 0.5 to 2 mm. in diameter. The coronary artery orifices were widely patent. The lining of the anterior descending branch of the left coronary artery was extensively mottled with atheromatous plaques, while relatively few were observed in the circumflex branch and in the right coronary artery.

The right and left kidneys weighed 100 and 130 gm., respectively. There were numerous wedge-like depressed scars on the surfaces. The cortical markings were irregular and indistinct. The liver weighed 1,700 gm. and the spleen 300 gm. There were no gross changes observed in these organs. There were no noteworthy changes in the biliary, pancreatic, or genitourinary systems, adrenals, thyroid, parathyroid, diaphragm, esophagus, stomach, or small and large intestine. The ribs and vertebrae showed no changes.

Fresh tissue sections of the tongue and myocardium were stained with an iodine-sulfuric acid preparation. This showed an extensive brown staining reaction characteristic of amyloid.

Microscopic Examination.—Histological sections were stained with hematoxylin and eosin. In all tissues examined there was marked thickening of the walls of the small arteries by scar tissue; this was frequently most pronounced in the intima, but very often the entire vessel wall was thickened, and the normal differentiation of intima, media, and externa was no longer apparent. Scattered throughout the thickened arterial walls were masses of red hyaline material, which gave the characteristic staining reaction of amyloid. In some of the larger arteries the amyloid was deposited in greatest abundance at the junction of the thickened intima with the media. In others the distribution was more diffuse in the media and adventitia.

In microscopic sections from the tongue (fig. 1 and 2), there were huge masses of thick-walled arteries, sometimes occupying 75% of the microscopic field. Amyloid was found in great abundance in these arteries. The muscle fibers of the tongue also contained amyloid, and it was occasionally possible to demonstrate that a normal muscle fiber became continuous with one containing amyloid. In the deeper portions of the tongue, there were huge scars containing waxy, red amyloid.

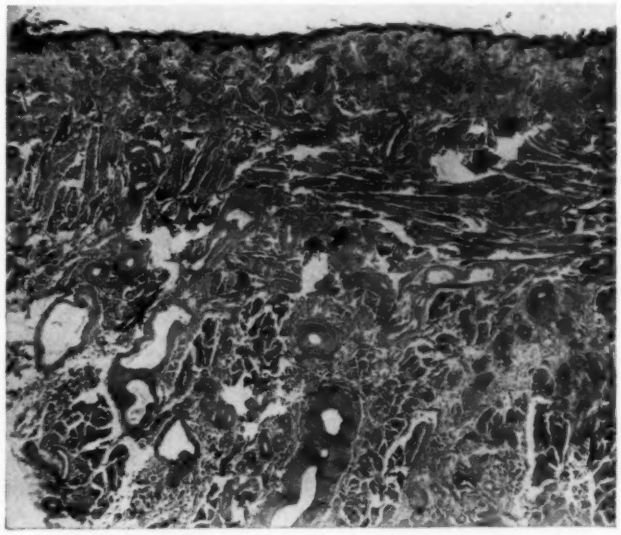

Fig. 1.—Tongue. Masses of amyloid are deposited beneath the epithelial surface and in the muscle bundles. The vessel walls are thickened by amyloid. (Hematoxylin and eosin stain × 25.)

Microscopic examination of the heart showed that the muscle fibers were of increased diameter and contained scattered masses of amyloid substance. The small arteries in the myocardium were everywhere thickened by scar containing amyloid. The lumens of these blood vessels were markedly reduced, so that the diameter of the lumen was frequently less than one-sixth of the thickness of the wall. The fibrous tissue between the heart muscle fibers was everywhere increased.

The alveoli of the lungs for the most part were filled with a pink, hyaline precipitate. Many of them contained masses of red blood cells. Occasional alveoli contained exudates of large mononuclear cells, whose cytoplasm was packed with the granular yellow pigment of changed blood. The small arteries in the sections presented the same amyloid and fibrotic changes seen in other tissues.

Sections of the spleen, kidney, liver, adrenals, thyroid, gastrointestinal tract, and prostate all showed the blood vessel changes noted in the tongue, myocardium, and lung. The final pathological diagnosis was primary systemic amyloidosis with involvement of the heart, tongue, and the vascular systems of the lungs, liver, spleen, kidneys, adrenals, thyroid, prostate, and gastrointestinal tract, along with pulmonary emphysema and acute congestive heart failure with pulmonary edema.

COMMENT

The importance of macroglossia as seen in primary systemic amyloidosis differs with various authors. Koletsky and Strecher [5] stated that one of the most constant findings in this disease is enlargement of the tongue. In their review of the literature up to 1938, they found the tongue the seat of amyloid deposits in 20 of the 24 cases reported. In 1945 Lindsay and Knorp [6] reviewed 15 cases in addition to those tabulated by Koletsky and Stretcher and added one of their own. Of these 16 cases, in only one was amyloid described in the tongue. Dahlin,[7] in reporting six cases from the Mayo Clinic in 1949, found macroglossia from amyloid disease in only one of six. In his review of the literature he found macroglossia in less than one-third of the cases and flatly stated that this diagnostic sign was over rated. Whether amyloid macroglossia appears frequently or infrequently,

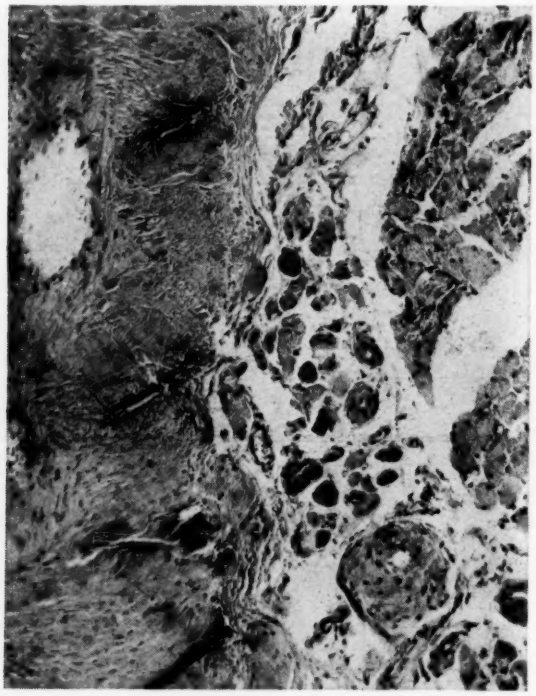

Fig. 2.—Tongue. Vessel walls are thickened by amyloid deposits. There is considerable luminal narrowing. (Hematoxylin and eosin stain × 175.)

it still remains as one of the few bases on which a clinical diagnosis can be made. This is well illustrated in the case reported here, as the only evidence of a serious and extensive underlying disease was macroglossia.

The only other avenues to a clinical diagnosis have been biopsies of the skin, mucous membranes, and muscle. The intravenous congo red test has occasionally been an aid, but only when the reaction was positive. Both positive [8] and negative [9] results have been reported. In the case reported here, the reaction was negative.

Up to 1949, according to Dahlin,[7] there were 54 cases of true primary systemic amyloidosis reported in the literature. Among these, there was cardiac amyloid infiltration in 46; in 25 of these myocardial insufficiency was considered the cause of death. The gastrointestinal tract was involved in 33 cases. In five of these there was serious hemorrhage from the gastrointestinal tract. Amyloid of the tongue was reported in 26 cases. Involvement of the lungs was noted in 24 cases, of the skeletal muscle in 19 cases, and of the skin in approximately one-fourth of the cases. He noted that in 21 cases the liver and kidneys were involved and in 20 cases the spleen was involved. Other reported sites of involvement are the lips, buccal mucosa, pharynx, larynx, esophagus, trachea, bladder, anus, dura mater, sympathetic ganglion, peripheral nerves, bone, tendon, joints, bone marrow, and practically the entire genital tract, in both sexes. There have been no reports of deposits within the brain.

Amyloid infiltration of the heart is by far the commonest lesion and is usually the direct cause of death. Among the 48 cases of primary systemic amyloidosis studied by Eisen,[10] there was evidence of congestive heart failure in 26, or 54%. According to Ballinger,[11] the clinical picture of amyloid heart disease is that of intractable congestive failure of unknown cause. There is usually cardiac enlargement but no evidence of valvular disease, hypertension, or coronary sclerosis. The electrocardiograms usually indicate myocardial damage, but it is of a nonspecific nature. There are usually altered T wave patterns, prolonged P-R intervals, and low voltage complexes. He concludes that the most characteristic clinical feature is rapidly progressing, intractable congestive failure.

SUMMARY

A case of primary systemic amyloidosis is reported. Clinically the patient presented only a painless, diffuse, symmetrical enlargement of the tongue. The result of an intravenous congo red test was normal. Shortly after surgical resection of the tongue had been completed, the patient suddenly died. Postmortem examination revealed extensive amyloid deposits in the tongue and myocardium. There was widespread involvement of small blood vessels throughout nearly all the other organ systems.

20 Fourth Ave., S. W.

5. Koletsky, S., and Strecher, R. M.: Primary Systemic Amyloidosis: Involvement of Cardiac Valves, Joints and Bones, with Pathologic Fracture of the Femur, Arch. Path. **27**: 267-288 (Feb.) 1939.

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9. Reimann, Koucky, and Eklund[3] Golden, A.: Primary Systemic Amyloidosis of the Alimentary Tract, Arch. Int. Med. **75**: 413-416 (June) 1945.

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11. Ballinger, J.: Amyloid Heart Disease, Am. J. M. Sc. **217**: 308-313, 1949.

Preventive Geriatric Medicine.—The most significant potentialities of geriatric medicine lie in the area of preventive or anticipatory therapy during the years of senescence. Any dysfunction which tends to accentuate or accelerate depreciation may be detected early; to wait for obvious symptoms and signs is to wait too long. Maximum benefit derives from constant alert search for early subtle changes whose consequences may not become obvious for many years. One of these is mild hypothyroidism, which presents significant potentialities in inducing cumulative harm through hypercholesterolemia, myocardial damage, anemia and intellectual retrogression. Our observations lead us to the conviction that a basal metabolic rate determination should be routine in health inventories after 40, when applied to apparently well people. This is part of anticipatory medicine, or preventive geriatric medicine.—Seruch T. Kimble, M.D., and Edward J. Stieglitz, M.D., Hypothyroidism: A Geriatric Problem, *Geriatrics*, January-February, 1952.

USE OF FUNCTIONAL DEVICES FOR DISABILITIES OF THE UPPER EXTREMITY

REPORT OF A CASE

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and
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Paralysis or weakness of muscles of the upper extremity is frequently encountered as a result of neuromuscular disorders or trauma. Tightness of fascial planes and deformities are secondary characteristics. These conditions, without bone or joint injury, seldom merit immobilization. Protection, support, and methods designed to assist and promote functional capacity must be considered. The prescription of the device or technique is a responsibility of the physician. The device must be examined when it is completed by the brace mechanic to make certain that it is properly fitted and that its purpose is being accomplished. It follows that the patient must be frequently re-examined to determine whether increased functional capacity necessitates an alteration or discontinuance of the device prescribed.

A physician who accepts responsibility to manage weakness of the upper extremity must recognize the advantages and the limitations of functional aids. There is nothing that will provide a satisfactory substitute for good medical judgment and adequate general medical care of good quality. There are times when motion and activity are most important, and there are times when rest is equally important. Our remarks are directed toward the management of soft tissue injuries that have been completely and adequately treated by medical and surgical techniques in the early and acute stages. This is particularly true of patients with extensive soft tissue damage and in peripheral nerve injuries. It is recognized that the time interval from original injury to the time when functional devices may be indicated will vary. It is never too early, however, for the specialist in physical medicine to think of the patient's disability in terms of functional capacity and total rehabilitation.

Any condition of the upper extremity which impairs function to any degree must be evaluated to determine the advisability of a functional device.

PRESCRIPTION FOR FUNCTIONAL DEVICES

In order to evaluate functional capacity, the physician must know the origin and insertion of muscle structures, their nerve supply, and nerve roots. He must know the normal and usual function of individual muscles and muscle groups. He must estimate ultimate potential functional capacity or the irreversible nature of a given lesion. Electromyography is an aid of unusual importance in this respect.

It is well recognized that devices used in hydrotherapy and electrotherapy must never be associated with the treatment of specific diseases. There is no substitute for a thorough study of the patient, a diagnosis and a plan of management based on sound medical principles. This applies to the use of functional devices. A piece of metal skilfully molded into specific contours cannot be regarded as a satisfactory device for a specific disability.

A functional aid can be intelligently prescribed only after a complete evaluation of individual weakness, tightness, and deformity, and it must be fitted to the contours and the needs of the individual patient. Certain functional aids may accomplish their purpose for long periods of time without change. Frequently, however, as functional capacity improves, alterations and changes are indicated and must be prescribed and fitted with the same care and diligence as the original device.

THE BRACE MECHANIC

The brace mechanic is a valuable ally of the physician. His primary mission is to produce an appliance exactly as it is prescribed. He should have a good mechanical

Fig. 1.—Defect in the origin of the mid-deltoid muscle.

background and an inventive capacity to provide a device to meet any need. He must have the judgment and patience to realize that changes are frequently indicated and necessary to provide protection, support, and functional assistance for the specific condition in which they are prescribed. No matter how appealing to the eye or how ingenious the device may be, it is worthless if it does not accomplish the result that is intended by the physician. The competent brace mechanic should work under the supervision of the physician who is prescribing for a particular patient. He should select material with consideration given to stability, durability, lightness, and comfort. The brace mechanic is an important member of the medical team, but he is not qualified by training or

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Chief, Physical Medicine Service, Brooke Army Hospital (Lieutenant Colonel Shields), and Chief, Physical Medicine Consultants Division, Office of the Surgeon General, Department of the Army (Colonel Smith).

experience to be completely responsible for both the prescription and the preparation of the aid. If the physician fails to assume his responsibility, the brace mechanic will do so and cannot logically be censured for this effort. The duty of the brace mechanic is to fill the prescription and then present the patient to the physician to determine whether the purpose of the device is realized.

FUNCTIONAL AIDS

Numerous excellent functional aids have been described for use in the treatment of upper extremity weakness. Bunnell [1] has used splints and braces to protect and support soft tissue disabilities of the upper extremities in a most effective manner. He has taught that a knowledge of structure and function is basic in efforts to prevent and correct deformity and to preserve and promote functional capacity.

Bennett [2] has popularized the use of the overhead sling in convalescent care of the weakened shoulder. He states: " . . . maximum return of functional capacity, within the limitations imposed by these basic lesions is dependent on three factors: (1) range of motion, (2) muscle group strength, and (3) coordination of muscle action. It is necessary that all articulations involved in the movement undertaken have sufficiently free and painless range of motion. Otherwise, the most effective use of muscles acting on these articulations can never be obtained."

Koch and Mason [3] have described purposeful splinting of the hand after injuries and infections. They emphasize rest and relaxation for injured and inflamed tissues, and in postoperative management they also

Fig. 2.—X-ray of the left shoulder shows comminuted fracture of the spine of the scapula, fracture of upper portion of glenoid, and a fragment from the acromion process displaced laterally.

stress "bringing constant and prolonged tension to bear upon scar tissue whose gradual contraction interferes with the function of the hand."

1. Bunnell, Sterling: Surgery of the Hand, Philadelphia, J. B. Lippincott Company, 1944.

2. Bennett, R. L.: Convalescent Care of the Weakened Shoulder, with Particular Reference to Use of Overhead Sling, South. M. J. **40**: 120-127 (Feb.) 1947.

3. Koch, S. L., and Mason, M. L.: Purposeful Splinting Following Injuries of the Hand, Surg., Gynec. & Obst. **68**: 1-16 (Jan.) 1939.

Britt and Bennett [4] have described excellent supportive apparatus to aid in the accomplishment of maximum functional results in the care of weakness of the forearm and hand in the after-effects of poliomyelitis. They state, in discussing relationship of physical medicine to orthopedic surgery: "It should be remembered

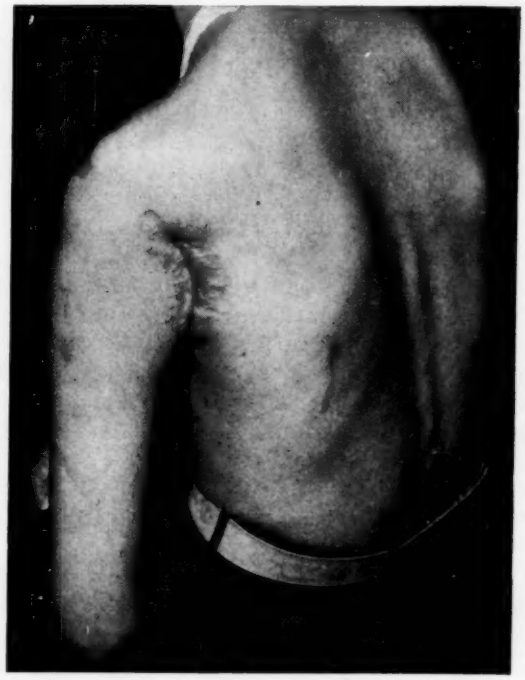

Fig. 3.—Maximum abduction before beginning treatment.

that the surgical results are greatly influenced by the caliber of early conservative care. Prevention or minimization of deformities and attainment of maximum coordination and strength will make surgery easier to perform and will facilitate the functional capacity."

Report of a case is presented herewith to show the relationship of a functional device to the rehabilitation effort.

REPORT OF A CASE

A 22-year-old white soldier was wounded in action, in Korea, on Jan. 26, 1951. He received a perforating missile wound of the left shoulder; a compound, comminuted fracture of the left scapula; a perforating missile wound of the right upper arm; a perforating missile wound right forearm, with radial, median and ulnar nerve involvement; a compound, comminuted fracture, right ulna; and penetrating missile wound of the left lower leg. These injuries were the result of enemy mortar shell fragments. He was given first aid at an aid station and evacuated to an Army hospital in the forward area, where, on January 27, he was given penicillin and whole blood. Extensive débridement of his right arm and forearm and left shoulder was done. He was evacuated from this hospital on January 29, arriving at an Army hospital in Japan on January 30. Here débridement of the left lower leg was done on February 1. The patient was prepared for evacuation to the United States and left Japan on March 29, arriving at an Army hospital in the United States on April 6.

During his stay in Japan there was a secondary closure made of all the débrided areas. He received penicillin continuously during his stay in the hospital in Japan. On his arrival in the United States, his right arm was in a long arm cast.

He was presented to a joint rehabilitation clinic (orthopedic, plastic surgery, and physical medicine services) on April 19, principally because of marked limitation of range of motion along with atrophy of muscles of the left shoulder. There was a well-

healed scar over the posterior aspect of the left shoulder, with some tightness. None of the muscles about the shoulder girdle were capable of overcoming gravity. There was a well-healed scar over the origin of the middle deltoid. The middle portion of the left deltoid appeared to be torn from its origin on the acromion process, as evidenced by a bulging of muscle belly without any tension as far as 6 cm. below the acromion process (fig. 1).

X-rays of the left shoulder revealed a comminuted fracture of the spine of the scapula, with wide spreading of the fragments, and also in an area of the scapula just below the spine, including the upper portion of the glenoid. One large fragment from the acromion process was displaced laterally just above the greater tuberosity of the humerus (fig. 2).

There was marked limitation of motion in all planes in the glenohumeral joint. The group considered closed manipulation, under anesthesia, to improve range of motion. The physical medicine service suggested that an electromyographic study be done to determine whether there was any peripheral nerve damage about the left shoulder. This was considered important because of the more prompt return of muscle strength to maintain active range if the muscle atrophy were due only to disuse. The left deltoid (anterior, middle, posterior), pectorals, infrapinatus, rhomboids, biceps, and triceps were sampled. Normal motor units were present, and there was no fibrillation of denervation. The members of the rehabilitation clinic agreed to have the physical medicine service attempt to improve range of motion and muscle strength in the left shoulder by means of sling suspension and activity. Maximum abduction, left shoulder, before beginning treatment is shown in figure 3.

The patient was placed in a wheelchair with sling suspension during the day, and a program of activity in both physical and occupational therapy was prescribed. Figure 4 shows the patient working in occupational therapy in his sling suspension. Figure 5 demonstrates the increased active range of motion that resulted from this type of management 18 days after beginning treatment. There is complete passive range in the left shoulder joint in all planes. There is limitation of active abduction owing to weakness of deltoid and loss of origin of middle fibers. A surgical procedure to re-establish deltoid muscle continuity is planned for this patient.

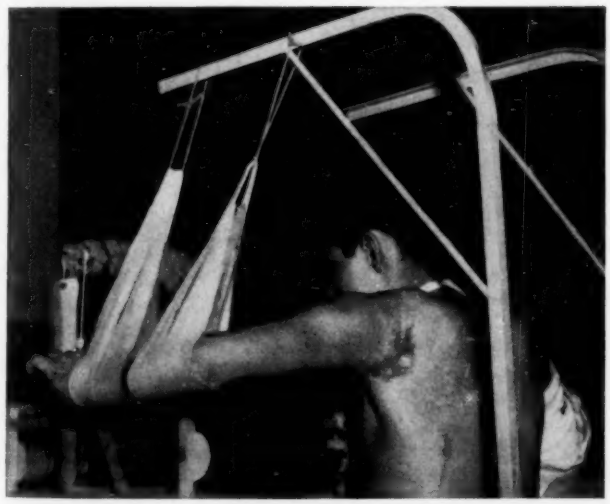

Fig. 4.—The patient working in occupational therapy in his sling suspension to improve muscle power and strength and range of motion.

COMMENT

This case is reported to demonstrate that bone and soft tissue damage are frequently associated in the same segment after trauma. Management of this type of injury is a joint responsibility of the physiatrist and the orthopedic surgeon. Protection and support of the segment, prevention of ankylosis, and improvement in function and muscle strength are the purposes of the functional device described in this report. Because of the destruction of the origin of the middle deltoid muscle, this patient has also incidently received preoperative care. Because the weakness in this left shoulder segment is due partially to a muscle mechanical fault, this patient will be in sling suspension until the orthopedic service elects to reconstruct the muscle, and he will then be given the same protection and support along with a program of activity until the best possible functional result is obtained.

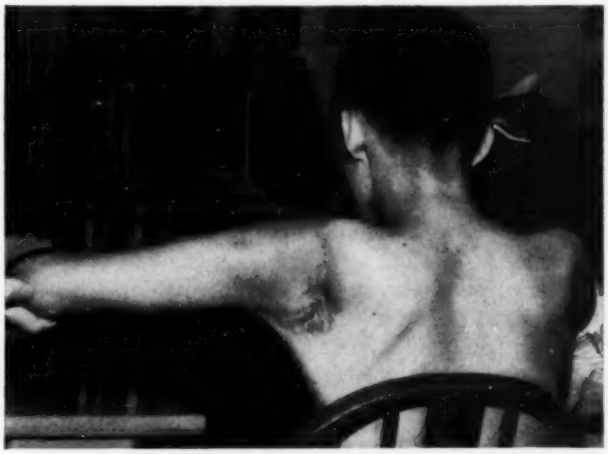

Fig. 5.—Increased active range of abduction, which resulted from this type of management 18 days after beginning treatment.

SUMMARY

1. The use of functional devices in the management of soft tissue disabilities in the upper extremity is discussed in general terms.

2. A case is reported to demonstrate the use of a particular device in the management of a patient with both soft tissue and bone damage in a shoulder segment.

3. Any condition that impairs function of the upper extremity should be evaluated to determine the advisability of a functional device.

4. The prescription of the device or technique is a responsibility of the physician.

5. It is the duty of the physician to evaluate muscle weakness, tightness, and deformity and to prescribe the device.

6. It is the duty of the brace mechanic to produce a device that will accomplish the purpose intended by the physician.

7. A functional device should be fitted to the individual patient.

4. Britt, L. P., and Bennett, R. L.: Care of the After-Effects of Poliomyelitis: Forearm and Hand, Arch. Phys. Med. **31**: 646-653 (Oct.) 1950.

Fatigue and Psychoneurosis.—Physicians can easily lose sight of the fact too that fatigue and lack of energy often do not represent disease of organs so much as they represent an emotional disorder involving the entire personality structure. In ordinary life, normal people are hardly liable to genuine exhaustion, since recovery from physical fatigue is rapid. However, some persons are truly exhausted in the physical sense because of a neurosis.—H. E. Harms, M.D., and T. L. L. Soniat, M.D., The Meaning of Fatigue, *The Medical Clinics of North America*, March, 1952.

THROMBOTIC OBLITERATION OF THE ABDOMINAL AORTA

REPORT OF A CASE

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and
Samuel G. Plice, M.D., Chicago

The syndrome of thrombotic obliteration of the aortic bifurcation, first mentioned by Graham in 1814,[1] has been firmly established clinically by Leriche and Morel.[2] This condition has no relation to the commonly recognized "saddle embolus." It consists of a gradual occlusion of the lower abdominal aorta near the bifurcation, extending downward into the common iliac arteries. It sometimes originates in one common iliac artery, later extending to the other iliac artery and to the aorta. The process frequently extends upward and often obliterates the right renal artery. Most of the case reports have concerned young men who were unable to maintain an erection because of inadequate blood flow into the corpus spongiosa. Muscular fatigue of the legs is an associated condition. The following case report is submitted because it presented a difficult problem in differentiation from coarctation of the aorta, and also because the patient was a woman. We have found only two other cases reported in women.[3]

Fig. 1.—Large mural thrombus in left ventricle; pedunculated thrombus in left auricle.

REPORT OF CASE

A white woman, aged 33, was admitted to St. Anne's Hospital because of severe pain in the region of the right kidney. She showed all the signs and symptoms of hypertensive heart disease with advanced congestive heart failure. She had had repeated episodes of heart failure for seven years, during which time she had been found to be hypertensive and had been told she had angina pectoris. Five years before her last admission, cesarean section had been performed in the seventh month of pregnancy, because of severe heart failure. At that time the patient's blood pressure was said to be 210/120 mm. Hg; an intravenous pyelogram was reported normal; and a cold pressor test was positive. An electrocardiogram revealed a low T wave in lead 1 and inverted T in CF5. About a month before the patient was transferred to this hospital, she had been given a diagnosis of coronary thrombosis, pulmonary embolism, and congestive heart failure. She consented to come to the hospital only because the right lumbar pain was so severe.

When she was admitted, her blood pressure was 162/116 mm. Hg, and her pulse rate was 72. There was pronounced edema, anasarca, ascites, enlargement of the liver, and congestion of the lungs. The heart was grossly enlarged and dilated. The feet were cold and numb. The femoral and popliteal pulses could not be detected, nor could the blood pressure be measured in the legs. There was 860 mg. of albumin per 100 cc. of urine and only moderate nitrogen retention in the blood. Because of the absence of pulsation in the patient's legs, a diagnosis of coarctation of the aorta was considered, but roentgen examination failed to show the characteristic absence of the aortic knob, and there was no notching of the ribs. A piperoxan (benodaine®) hydrochloride test for pheochromocytoma was negative. Later, the right leg became cyanotic, and the patient died a cardiac death.

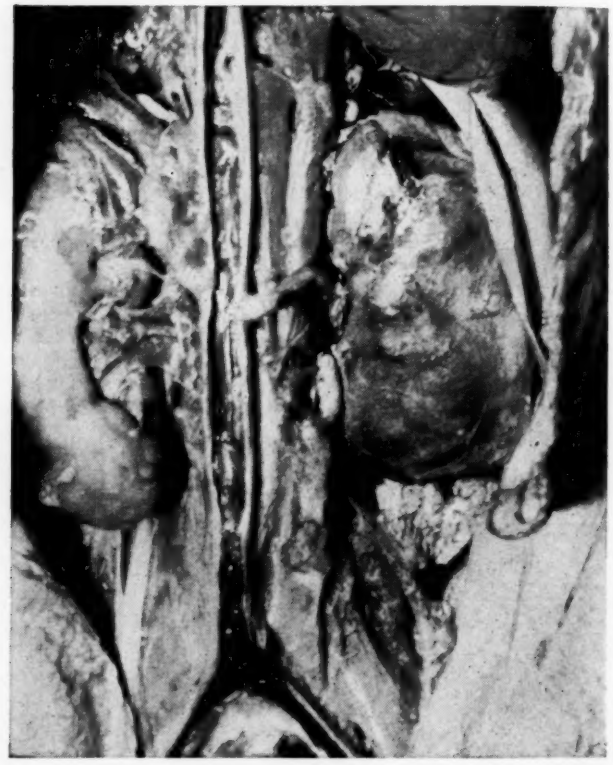

Fig. 2.—Firm thrombus completely filling aorta and extending into both common iliac arteries and into right renal artery.

Autopsy revealed a large degenerating thrombus in the left ventricle and old and recent thrombi in both auricles. In the left auricle there was one thrombus about 2 cm. in diameter attached to the wall by a narrow pedicle about 6 mm. in length (fig. 1). The valves and the coronary vessels were normal. Only a moderate degree of atheromatous change had occurred in the first part of the aorta. The endocardium itself was thickened in places, with considerable fibrosis and round cell infiltration in the myocardium. There was no infarction.

Beginning at the level of the diaphragm, a firm thrombus completely filled the aorta and extended into both common iliac arteries and into the right renal artery. The process appeared to be oldest at a point 5 cm. above the bifurcation (fig. 2). The left kidney appeared normal. A definite atheromatous change had taken place in the wall of the aorta, with the inflammatory reaction extending to the adventitia. A hemorrhagic infarction was found in the base of the right lung.

Professor of Clinical Medicine, Stritch School of Medicine, Loyola University (Dr. Plice).

1. Graham, R.: Case of Obstructed Aorta, Med. Chir. Tr. **5**: 297, 1814.

2. Leriche, R., and Morel, A.: The Syndrome of Thrombotic Obliteration of the Aortic Bifurcation, Ann. Surg. **127**: 193 (Feb.) 1948.

3. (*a*) Lueth, H. C.: Thrombosis of the Abdominal Aorta: A Report of Four Cases Showing the Variability of Symptoms, Ann. Int. Med. **13**: 1167 (Jan.) 1940. (*b*) Giblin, D. J.: A Case of Aortic Thrombosis, M. J. Australia **1**: 215 (March 11) 1944.

COMMENT

One can only speculate about the origin of the cardiac lesion in this patient. The endocardial change and the thrombi may well have been caused by a much earlier rheumatic disease, although no evidence of valvular disease was discovered. Lueth [3a] reported a somewhat similar case, in which there was rheumatic mitral and aortic stenosis with a large organized thrombus in the left auricle, and Delannoy [4] reported a case with mitral valvular disease. It is possible that the atheromatous change was superimposed on rheumatic aortitis localized in this area of the aorta. Duguid [5] believes that organized mural thrombi are a common cause of intimal thickening, which sometimes undergoes a fatty change identical with atherosclerosis. The progression of the disease appears to be very slow, extending over a number of years. It eventually leads to death from gangrene, unless renal artery involvement produces hypertension, in which case death results from heart disease or uremia.[6]

SUMMARY

Thrombotic obliteration of the abdominal aorta occurs most commonly in middle-aged men. Heart disease is commonly associated with it. The patient reported on here was a young woman with mural endocarditis and multiple intracardiac thrombi. The question of rheumatic aortitis as an underlying factor is raised.

4438 Madison St. (Dr. Plice).

4. Delannoy, E.: Résection du carrefour aortique et des bifurcations iliaques pour thrombose de l'aorte terminale, Mém. Acad. de chir. **71**: 89 (Feb. 28) 1945.

5. Duguid, J. B.: Thrombosis as a Factor in the Pathogenesis of Aortic Atherosclerosis, J. Path. & Bact. **60**: 57 (Jan.) 1948.

6. Straus, R.; Dominguez, R., and Merliss, R.: Slowly Progressive Occlusive Thrombosis of the Abdominal Portion of the Aorta, Am. J. M. Sc. **211**: 421 (April) 1946.

RUPTURED SPLEEN

DIAGNOSIS BY SERIAL X-RAY EXAMINATIONS

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and
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The mortality from ruptured spleen, estimated at more than 75%, demands prompt diagnosis if effective surgery is to be employed.[1] In a recent review of roentgenography of ruptured spleen, the diagnostic value of serial examinations was emphasized.[2] The case reported herein exemplifies the accuracy of this procedure.

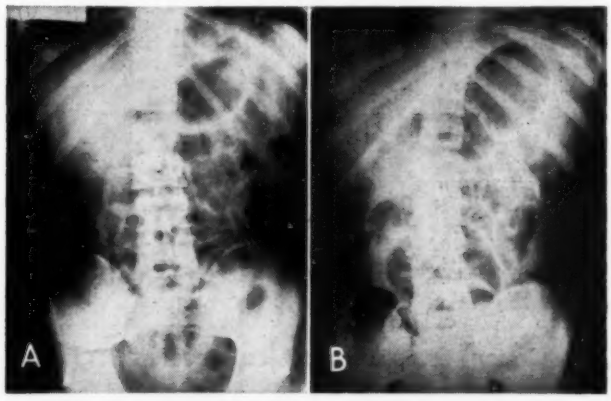
REPORT OF A CASE

J. M., a man aged 22, while playing baseball ran directly into another player, striking his left side against the other player's hip. The patient was winded and fell to the ground in shock. On his arrival at the hospital, a few minutes later, he was still in shock and received immediate treatment. At first the patient was pulseless, cyanotic, and semiconscious. His blood cell count revealed 3,800,000 red blood cells and 69% hemoglobin. His hematocrit was 31. It was not possible to obtain a blood pressure reading.

Approximately one hour after admission the patient began to complain of pain in the left shoulder area. This pain was so severe that x-rays of the chest as well as the abdomen were ordered. Physical examination showed that the patient was slightly cyanotic and perspiring freely. He was pulseless. Examination of the abdomen revealed considerable rigidity over the left upper quadrant. Two hours later, an x-ray examination revealed minimal elevation of the left part of the dome, but nothing else abnormal. No fractured ribs were detected. The radiologist suggested the possibility of a ruptured spleen and pointed out the advisability of repeated examinations to demonstrate any changes that might occur in the size and shape of the splenic shadow.

During the first 18 hours after hospitalization the patient recevied 3 pt. (1.5 liters) of blood and 3 pt. of plasma. Twelve hours after the first x-ray examination another x-ray of the abdomen was obtained. This revealed a slightly increased elevation of the left portion of the dome of the diaphragm, with a definite increase in the size and density of the splenic shadow. The splenic flexure was displaced downward. Increased width of the spaces between the distended small intestinal loops suggested the presence of free blood in the peritoneum. At this time the hematocrit had dropped to 20; red blood cell count was 4,300,000 and hemoglobin 65%. The blood pressure finally had risen to 70/30. The pulse rate at this time was approximately 100.

The patient was taken to the operating room, and, while a blood transfusion was being given, the abdominal cavity was opened. Much free blood was found within the peritoneum. The spleen was found completely ruptured into two separate segments, one of which was free within the peritoneal cavity; the other still remained attached to its pedicle. Both segments were removed. The patient made an uneventful recovery and was discharged from the hospital on the ninth day after his admission.



A, x-ray of the abdomen made two hours after injury to the left lower lateral portion of the chest, showing slight gaseous dilatation of the stomach but no other signs that might suggest the presence of a ruptured spleen. *B*, x-ray of the abdomen 12 hours later. The density of the splenic area has increased, and the size of this shadow has expanded downward and toward the right. This expanding shadow suggests a ruptured spleen with perisplenic hemorrhage. The increased separation between the loops of small intestines suggests free fluid (blood?) in the peritoneal cavity.

COMMENT

Rupture of the spleen with active bleeding resulting in shock often obscures the diagnostic symptoms and signs of ruptured spleen. It is at this stage that the x-ray examination can be of considerable help.[1] There are many valuable x-ray signs, such as dilatation of the stomach, serration of the margins of the greater curvature, elevation of the left portion of the diaphragmatic dome, downward displacement of the cardiac end of the stomach, downward displacement of the splenic flexure of the

From the Department of Surgery, Newcomb Hospital (Drs. Thomas and Reinhart).

1. Wright, L. T., and Prigot, A.: Traumatic Subcutaneous Rupture of the Normal Spleen, Arch. Surg. **39**: 551-576 (Oct.) 1939. Roettig, L. C.; Nusbaum, W. D., and Curtis, G. M.: Traumatic Rupture of the Spleen, Am. J. Surg. **59**: 292-319 (Feb.) 1943.

2. Gershon-Cohen, J.; Hermel, M. B.; Byrne, R. N., and Bringhurst, L. S.: Rupture of the Spleen: Roentgen Diagnosis, Radiology **57**: 521-527 (Oct.) 1951.

colon, compression of the fundus, separation of the intestinal loops by fluid, obliteration of the splenic shadow, increased density of the shadow under the left side of the dome, displacement of the stomach to the left, and, finally, a progressively larger splenic shadow revealed by serial studies. Among these x-ray signs, the displacement of the stomach and of the splenic flexure of the colon with progressive increasing density and size of the splenic shadow as indicated by serial x-ray studies are probably most important.

SUMMARY

A case of ruptured spleen is reported in which serial x-ray examinations revealed an enlarging splenic shadow, increasing displacement of the splenic flexure of the colon, and separation of the intestinal loops by free blood in the peritoneum. The value of these findings is emphasized in the diagnosis of ruptured spleen.

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PRIMARY ADENOCARCINOMA OF THE ESOPHAGUS SIMULATING A BENIGN LESION

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and
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Primary adenocarcinoma of the esophagus is an uncommon finding. In a series of 89 patients with carcinoma of the esophagus recently reported,[1] there occurred only one primary adenocarcinoma, the remainder of the lesions being squamous cell neoplasms. Garlock,[2] whose experience with this type of lesion has been considerable, has seen but three primary adenocarcinomas of the esophagus. Adenocarcinoma of the esophagus occurs invariably as a secondary extension of a gastric lesion by contiguous spread from the cardia. When adenocarcinoma of the esophagus is primary, the malignant development takes place in submucosal esophageal glands or in heterotopic gastric glands that may be present in the esophagus.

The following report is of a primary adenocarcinoma of the esophagus presenting the appearance of a benign submucosal lesion on x-ray examination. The diagnosis of a malignant neoplasm was made only after histopathological examination of tissue obtained by esophagoscopy.

REPORT OF A CASE

F. S., a 45-year-old white woman, was seen in July, 1949, with a complaint of progressive dysphagia of nine months' duration. The dysphagia was caused only by ingestion of solid foods. She described the sensation as a "bone that has not passed down." Later, the dysphagia appeared more specifically to be an inability to initiate the swallowing reflex. On attempting to swallow she would cough and regurgitate a small amount of fluid. The attempts to swallow were accompanied by a burning pain in the left anterior portion of the chest, adjacent to the manubrium, which frequently was relieved by vomiting. There was no substernal pain. There had been a weight loss of 2 lb. (0.9 kg.) in the previous three months. The past history was not pertinent; a hysterectomy had been performed in 1941 for uterine fibromyomas.

Physical examination disclosed nothing essentially abnormal. The blood pressure was 134/90; the heart and lungs were normal. Abdominal examination revealed a suprapubic scar; it was soft, and no viscera were palpable. Rectal and sigmoidoscopic examinations disclosed no abnormalities. Results of laboratory studies were all within normal limits. Barium meal examination revealed a smooth filling defect of the proximal portion of the lower third of the esophagus 11 cm. above the diaphragm. The mass possessed sharply delineated margins and an intact mucous membrane pattern and measured approximately 3 cm. in diameter. There was no evidence of ulceration. The appearance suggested a benign submucosal tumor (myoma). The stomach and remainder of the intestinal tract were normal (figs. 1 and 2).

At esophagoscopy a large, hard mass was seen 30 cm. from the upper incisor teeth, protruding into the lumen and causing obstruction. The lumen was narrowed to several millimeters. The mucous membrane appeared intact but was arranged in ridges over the mass. A biopsy of the neoplasm was made; the histopathological report was columnar cell carcinoma (adenocarcinoma), probably of gastric origin. Because of the pathological diagnosis of adenocarcinoma, we again examined the patient roentgenographically to determine whether the lesion was primary in the stomach. The stomach again appeared to be entirely normal. The tumor was considered, radiologically, esophageal in origin, because submucosal infiltration between the cardia of the stomach and the area occupied by this lesion would be most unusual.

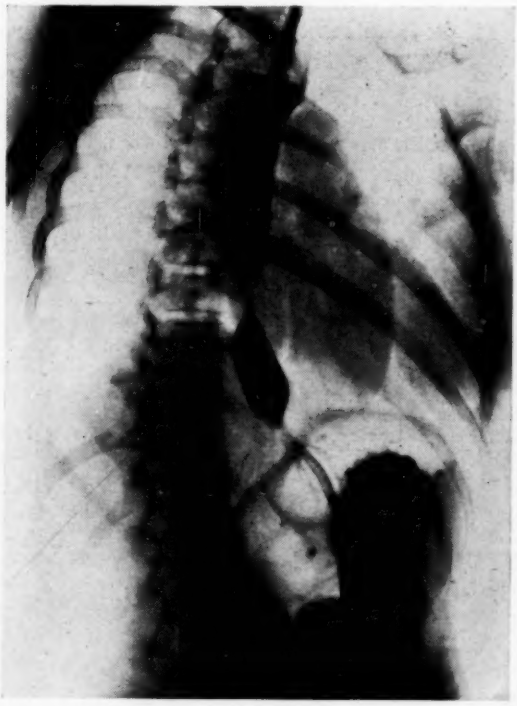

Fig. 1.—A smoothly marginated, filling defect, measuring 3 cm. in diameter, is seen at the junction of the middle and lower thirds of the esophagus, 11 cm. above the diaphragm. The remainder of the upper part of the gastrointestinal tract appears normal.

At operation, performed by Dr. John H. Garlock, a careful search of the stomach was made to determine whether this submucosal adenocarcinoma had any primary site in the gastric wall, but the small encapsulated mass between the middle and lower thirds of the esophagus, completely localized to the submucosal area, was the only lesion discovered. No lymph nodes were palpable. Transthoracic esophagogastrostomy with a supraaortic anastomosis was performed.

From the Otolaryngological and Radiologic Services of Mount Sinai Hospital, New York.

1. Gibbon, J. H., Jr.; Allbritten, F. F., Jr., and Templeton, J. Y., III: Carcinoma of Esophagus and Gastric Cardia, J. A. M. A. **145**: 1035 (April 7) 1951.

2. Garlock, J. H.: Personal communication to the authors.

Convalescence was complicated by a leak at the esophagogastric suture line, resulting in pneumothorax of the left side of the chest, shifting mediastinum, and effusion into the pleural cavity on the left. Thoracotomy for relief of the empyema was followed by complete recovery.

Pathological Report.—The lesion was a circular, flat, button-shaped, firm, indurated mass, 2 cm. in diameter, lying in the esophageal wall. The mucosa over the tumor was intact, yellowish, thick, and firmly adherent. Section of the tumor revealed that the muscularis in most areas was not invaded, but in others the tumor infiltrated to the serosal wall. There was no extra-esophageal spread of the lesion. The final diagnosis was an infiltrating adenocarcinoma arising beneath the surface epithelium, most probably from the submucosal esophageal glands. No evidence of metastasis was observed at last examination, November, 1951.

COMMENT

This case is unusual because primary adenocarcinoma of the esophagus is rare and because adenocarcinoma rarely simulates a benign lesion. Though esophageal

Fig. 2.—Spot roentgenographic studies exhibit the abrupt, smoothly marginated, filling defect. The mucosal pattern covering the lesion appears entirely normal.

mucous glands are uncommon in the distal portion of the esophagus, the pathological report suggests that the lesion originated from the submucosal esophageal glands. This primary adenocarcinoma of the esophagus simulated a benign lesion because it was completely encapsulated and submucosal. It was extraluminal, yet entirely intramural, and on roentgen examination it presented the characteristics of a benign lesion, i. e., a smooth filling defect with no destruction or distortion of the normal mucosal folds.[3] Ulceration into the mucosa had not yet occurred, though undoubtedly, had the lesion not been identified, it would have eventually broken through into the lumen of the esophagus.

CONCLUSION

The occurrence of a primary adenocarcinoma of the lower third of the esophagus, originating in the submucosal glands, is described as an unusual clinical entity. The roentgen appearance of the lesion belied its malignant nature, since the tumor presented no invasive qualities and no destruction of the mucosa. Definitive diagnosis could be made only by histopathological examination of tissue obtained by esophagoscopy.

1050 Park Ave. (Dr. Goldman).

3. Schatzki, R., and Hawes, L. E.: Tumors of Esophagus Below Mucosa and Their Roentgenological Differential Diagnosis, Rev. Gastroenterol. **17**: 991 (Nov.) 1950.

DEMONSTRATION OF L. E. CELLS IN PERICARDIAL FLUID

REPORT OF A CASE

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and
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The value of the so-called lupus erythematosus (L. E.) inclusion phenomenon of bone marrow and blood as an aid in the diagnosis of acute disseminated lupus erythematosus has been amply demonstrated.[1] It is the purpose of this paper to report a case of pericardial effusion due to acute disseminated lupus erythematosus in which the diagnosis was first intimated by the finding of L. E. cells in the Wright-stained buffy coat smears of the patient's oxalated pericardial fluid. Subsequently, large numbers of L. E. cells were demonstrated in buffy coat preparations made from an oxalated marrow specimen from the same patient. Response to cortisone therapy was striking and led to rapid resorption of the pericardial effusion.

REPORT OF A CASE

A 38-year-old white woman was well until May, 1950, at which time pain developed in the right thigh, with subsequent pain and swelling in the right leg and foot. In August, 1950, she was hospitalized and treated for thrombophlebitis, with prompt recovery. A positive serology was demonstrated at that hospital, and she was treated for latent syphilis with a course of penicillin in September, 1950. On September 11, she was first admitted to Multnomah County Hospital with tenonitis of the left eye, which responded well to symptomatic measures and penicillin therapy. On this admission the spleen was noted to be palpable 2 cm. below the left costal margin on maximum inspiration. She was discharged on September 18. In October, 1950, pain, tenderness, and induration appeared in the left lower calf. These symptoms cleared with elevation and hot packing. On October 22 and November 12, she experienced sharp substernal pains lasting about 10 minutes, associated with dyspnea, and of sufficient severity to awaken her from a deep sleep. On November 19, exertional dyspnea and orthopnea first appeared together with a raw soreness of the throat and upper part of the chest. On November 22, repeated episodes of sharp precordial pain, lasting 15 to 60 seconds each, became so severe and fre-

From the Division of Experimental Medicine and the Department of Medicine, University of Oregon Medical School Hospitals and Clinics.

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quent that she paced the floor at night. Dyspnea and orthopnea became increasingly severe. She was readmitted to Multnomah County Hospital on November 27.

Examination revealed her to be a fairly well-developed and well-nourished woman in acute respiratory distress, with short gasping respirations and a peculiar grunting type of cough. Her temperature was 99.6 F, pulse rate 120 per minute, respiration rate 40 per minute, and blood pressure 114/84. She was cyanotic, though peripheral venous distention was slight. There was dulness to percussion bilaterally at the lung bases posteriorly, with diminished breath tones and scattered medium resonant rales. The area of cardiac dulness extended to the midaxillary line in the fifth interspace on the left and 4 cm. to the right of the midsternal line in the fourth interspace. There was increased lower sternal dulness and no localized apical beat. A systolic thrill was palpable at the apex. The mitral first sound was rather sharp, and the aortic and pulmonic second sounds were accentuated. No murmurs were heard. A loud pericardial friction rub was audible over most of the left anterior portion of the chest but disappeared when the patient leaned forward in a sitting position. The liver was palpable 4 cm. below the right costal margin and was tender. The spleen was not palpated initially. There was no palpable enlargement of the accessible lymph nodes. A few varicose veins were present bilaterally in the lower extremities.

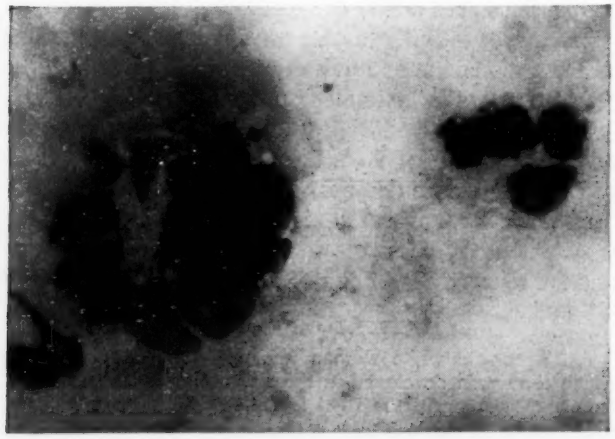

Fig. 1.—L.E. cell in the buffy coat smear of the patient's oxalated pericardial fluid (× approximately 1,250).

Laboratory examination showed 70% (9.7 gm.) hemoglobin, 3,040,000 erythrocytes, 5,300 leukocytes, with 58% segmented neutrophils, 1% band neutrophils, 2% segmented eosinophils, and 39% lymphocytes. The sedimentation rate was 19/109 (modified Westergren), and blood Kahn reaction 4+, and Kline 4+. Routine urinalysis showed no abnormal findings. No tubercle bacilli were found in concentration smear and culture of several sputum specimens. Venous pressure (antecubital) was 160 mm. of water. Arm to lung circulation time (ether) was less than 3 seconds. Arm to tongue circulation (sodium dehydrocholate [decholin®]) was 15 seconds. Purified protein derivative (Nos. 1 and 2) skin reactions were negative. A posteroanterior chest x-ray revealed a marked increase in the size of the cardiac shadow, possibly due to pericardial effusion. Cardiac fluoroscopy was not definitely diagnostic of effusion. Electrocardiograms were consistent with the diagnosis of subacute pericarditis.

The patient improved moderately on symptomatic therapy (bed rest, low salt diet, oxygen by nasal catheter, and meperidine [demerol®] hydrochloride for pain). The spleen was found to be palpable below the left costal margin on November 30. Pressure over the spleen produced pain in the left supraclavicular area. Paroxysms of coughing continued, and substernal pain was severe at times. A pericardial paracentesis yielded 140 cc. of serosanguinous fluid. This fluid contained 544 white blood cells per cubic millimeter with a differential count of 76% segmented neutrophils and 24% lymphocytes. There were 229,000 erythrocytes per cubic millimeter. Wright-stained buffy coat preparations of the pericardial fluid cells revealed L.E. cells to be present. A guinea pig inoculation with the pericardial fluid was performed and was negative for tuberculosis. Iliac marrow aspiration was carried out, and Wright-stained buffy coat preparations of the oxalated marrow specimen prepared by spinning the marrow at 3,000 rpm for five minutes revealed 229 L.E. cells per 500 segmented and band neutrophils. Accordingly, the diagnosis of acute disseminated lupus erythematosus was made. A pneumopericardium had been intentionally produced at the time of paracentesis, and subsequent roentgenogram disclosed a thickened pericardium. After the pericardial tap, dyspnea became slight. On December 23, cortisone therapy was instituted in the dosage of 300 mg. daily for two days, 200 mg. daily for two days, and then 100 mg. daily for three weeks before the dosage was tapered. The eosinophil count dropped from an initial 110 to 11 per cubic millimeter on the fourth day after cortisone therapy was started. Remarkable improvement ensued. She became euphoric and stopped complaining of transient abdominal pain. Dyspnea disappeared, and the liver and spleen regressed to normal size. On December 28, chest roentgenograms revealed

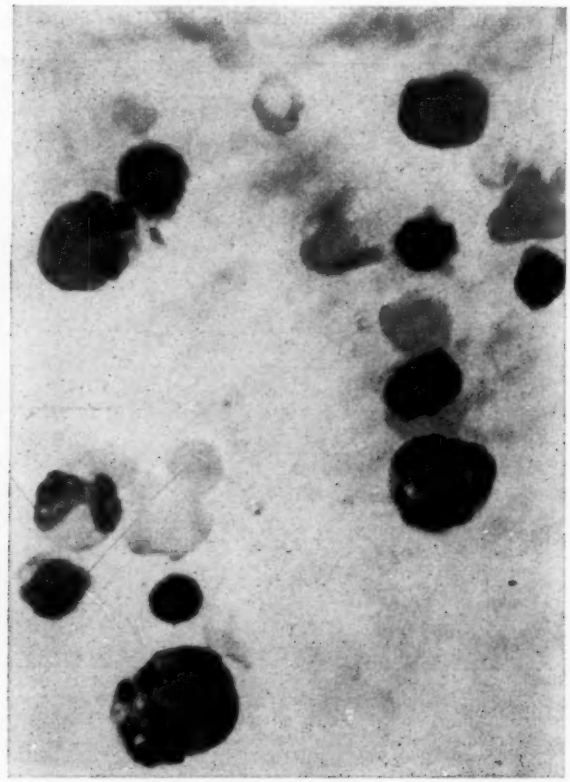

Fig. 2.—L.E. cells in the buffy coat smear of the patient's oxalated marrow (× approximately 1,065).

disappearance of the pneumopericardium and a heart shadow markedly decreased in size from that seen in the x-ray taken 17 days previously. A moon facies developed, but the patient did not gain weight. After cortisone therapy was started, she was observed in the hospital for 10 days and had no recurrence of complaints other than a transient swelling and tenderness of the left leg. By Jan. 17, 1951, the electrocardiogram had reverted to normal. She was discharged asymptomatic on February 1, to be followed in the outpatient clinic. During February, dyspnea and knife-like pleuritic pain developed in the left lower part of the chest. The spleen was enlarged and tender, and it was felt that perisplenitis best explained these symptoms. Because of the persistence of these symptoms, she was readmitted on February 22 and treated symptomatically with partial relief. Admission hematological studies on this occasion revealed a leukocyte count of 2,750 per cubic millimeter with a normal differential. She was discharged on March 4. On March 22, she was again seen as an outpatient and was complaining of painful shoulders and painful interphalangeal joints. Splenomegaly was again demonstrated. She is still able to carry on almost normal activity but remains moderately symptomatic.

SUMMARY

L. E. cells were demonstrated in buffy coat preparations of oxalated pericardial fluid aspirated from a 38-year-old white woman with pericardial effusion, splenomegaly, perisplenitis, and hepatomegaly. Buffy coat preparations from oxalated marrow of the same patient revealed diagnostic numbers of L. E. cells. Remission was induced by cortisone therapy.

CONCLUSION

Examination of Wright-stained buffy coat preparations of pericardial fluid and other body cavity effusions [2] may prove valuable in alerting one to the possibility of acute disseminated lupus erythematosus as the underlying disease.

2. Since preparation of this report, Dr. Raymond Grondahl, director of laboratories, University of Oregon Medical School Hospitals and Clinics, has demonstrated L.E. cells in the buffy coat smear of oxalated pleural fluid from an additional patient, whose oxalated marrow buffy coat preparation contained 31 L.E. cells per 500 band and segmented neutrophils. However, necropsy findings in this patient revealed only the tissue changes of subacute glomerulonephritis without any diagnostic findings of acute disseminated lupus erythematosus.

COUNCIL ON PHYSICAL MEDICINE AND REHABILITATION

The Council on Physical Medicine and Rehabilitation has authorized publication of the following article.

The Council wishes to express its appreciation for the valuable cooperation of the Advisory Committee on Artificial Limbs. The Committee members are Drs. Rufus H. Alldredge, Henry H. Kessler, and Paul E. Klopsteg and Messrs. J. B. Korrady and Lucius Trautman. RALPH E. DE FOREST, M.D., *Secretary.*

CERTIFICATION PROGRAM ADOPTED BY PROSTHETIC AND ORTHOPEDIC APPLIANCE INDUSTRY

The American Board for the Certification of the Prosthetic and Orthopedic Appliance Industry, Inc., is the full name of the control program designed to create a new order of practices in the artificial limb and brace industry. Already the medical profession, which assisted in its development, is feeling the benefits, and the Council on Physical Medicine and Rehabilitation believed the story of this unique program should be published.

The Certification Program grew out of the desire of leaders in the industry, and their allies in the medical profession, to set up a system which would identify the competent and ethical firms and personnel who serve people requiring a prosthetic or orthopedic appliance. After two years of study and preparation, the Certification Program was officially launched in August, 1948.

Now a large percentage of all the firms and their fitters engaged in the fabrication and fitting of artificial limbs or braces have placed their credentials before the Board for review and approval. Also, fitters in hospitals and government limb and brace shops are applying for certification in increasing numbers.

Three eminent orthopedic surgeons and four outstanding representatives of the industry itself make up the Board of Directors which passes on the credentials of applicant firms and fitters. The three surgeons on the first Board were Dr. Atha Thomas of Denver, Dr. Rufus Alldredge of New Orleans, and Dr. Henry Kessler of Newark. The four industry representatives were Messrs. Chester C. Hadden of Denver, J. Blaine Korrady of Chicago, David E. Stolpe of New York, and Lee J. Fawver of Kansas City.

Mr. Haddan was elected the first President of the Board, Dr. Thomas, Vice President, and Mr. Korrady, Secretary-Treasurer. Members of the Board serve three years and it is the policy of the Board not to renew a Director's term of office.

The present Board consists of the following Directors: Chester C. Hadden, President; Dr. Atha Thomas, Vice President; Walter R. Sievers, New York, Secretary-Treasurer; David E. Stolpe, Chairman of Examinations; Dr. Charles O. Bechtol, San Francisco; D. A. McKeever, Atlanta, and Dr. Clinton L. Compere, Chicago.

The national office of the Board is in Washington, D. C., and is under the supervision of Glenn E. Jackson, the Executive Director for the Board.

In the certification of firms and fitters, distinction is made between limbs and braces as the skills involved in the two fields vary. Accordingly, fitters are classified and certified for one or the other according to their credentials. A few qualify for both. The same applies to firms.

A certified fitter of artificial limbs is designated as Certified Prosthetist while a certified fitter of braces is designated Certified Orthotist. It can be noted here that the Certification movement in this craft is establishing a clearer terminology. Example of this is the abandonment of the term "mechanic" formerly used to refer to fitters of these appliances.

The welfare and comfort of the physically handicapped is the central aim of the Certification Program. It is designed to obtain for the handicapped the highest possible standards of workmanship, fitting, and service, and the benefit of the latest technical advances. This is accomplished by setting up standards which a firm and fitter must meet as a condition of approval. Thus, in effect, a "Bureau of Standards" has been established for the industry.

A mounting body of public and medical opinion will provide the Board with an effective enforcement instrument.

Besides, the Board "stands behind" the products and services of certified firms thus assuring the public and agencies who use them that they can depend upon a certified firm. The machinery for accomplishing this is similar to that employed by the medical profession's organizations. In cases of dispute, the complainant and the complained-against firm each appoints a doctor and a prosthetist or orthotist, and the Board appoints the fifth person who acts as chairman of this Arbitration Committee.

Not only are the prosthetists and orthotists passed upon by the Board, but also the firm itself. This is a unique feature of the program. In licensing plans for other professions, the individual's own credentials are appraised, not the place in which he works. But those who laid the groundwork for this Certification Program believed that the patient needing a prosthetic or orthopedic appliance must be served by a competent fitter with a device that is adequately and ethically manufactured.

Accordingly, on the official application for firms appear such requirements as: suitable place of business, adequate shop, full conformity with health and fire rules, private washing and toilet facilities, private fitting rooms, adequate facilities for the training of patients in use of their appliances, and strict conformity with the Fair Practice rules governing the industry as approved by the Federal Trade Commission.

A fitter desiring certification must meet specific conditions. First of these is the requirement of four years' experience in being "responsibly related" to fitting of prosthetic or orthopedic appliances. Next, his basic statement on his application must be signed by at least two licensed physicians. The basic statement is the foundation on which the program is built. It reads:

"By-laws of the Corporation require that the Directors may certify as qualified fitters of prosthetic and orthopedic appliances *only* those persons competent to take required measurements or casts, and to shape, adjust, and align the appliance on sound anatomical and mechanical principles so that it satisfactorily carries out its intended function *in accordance with a doctor's prescription.*

"So that the Directors may fulfill this requirement in a practical way, the applicant will present this statement to two or more duly licensed physicians who, after reading *this paragraph* and any other portions of this application as filled in by the

applicant, are respectfully asked to satisfy themselves each as he may see fit, that the applicant is *competent* as stipulated. The signatures of such physicians will be viewed by the Board as evidence that prescriptions for prosthetic and orthopedic appliances issued by them could in their opinion be satisfactorily fulfilled by the applicant."

When a fitter's application is found to meet these requirements the candidate is ready for examination. The examinations are held in the chief centers of the country. They consist of three parts: first, a written examination dealing chiefly with knowledge of anatomy, second, a thorough oral interview with the examining board. The third part is in a shop where, by actual demonstration, the candidate shows his all-round ability.

This examination system was launched in May, 1951. Already examinations have been held in New York, Atlanta, Los Angeles, and Chicago. Reports are that about 20% of the candidates who qualified and took the examinations during 1951 have failed while 80% have passed all tests and have been certified. The patch for a sleeve of a jacket, the gold pin for a coat, or the credentials card are evidences of certification for the guidance of doctors everywhere.

The Board considers that its standards are dynamic and not static. From the start it has been stated that the standards set during the opening year or so are to be considered as minimum. In its developmental stages, the Board submitted its plans to both the Federal Trade Commission and the Department of Justice for review and comment. Since the program of control was not to be one of government but of private enterprise, this was important. The reviewing officials praised the industry for its plans, especially commending the provision for both doctors and artisans on the controlling Board. This assured a dual result-control without illegal restraint of trade. It can be assumed that all decisions are fair and just to all concerned.

Every application of a firm or fitter is carefully investigated by a Board member when possible or by a committee, or both, so that the applicant must undergo a thorough examination before certification is granted. Filling out a questionnaire alone is not considered sufficient, but a personal investigation is made in every case.

The Certification Board plans to tighten the requirements in accordance with the needs and professional standards found to be desirable as the Certification Plan progresses.

Certified firms receive the official certificate for display in their places of business. It must be renewed annually, and current good standing is evidenced by display of a brass plate suspended beneath the certificate which carries the current calendar year inscribed prominently on it. Similarly, the certified fitter receives and must display his certificate. An annual card evidences his current good standing.

In accord with its policy of raising standards, the Board has been giving special attention to the problem of "salesmen" in the industry. Traditionally, firms employed salesmen to call on amputee prospects. This feature has been largely responsible in past years for the low status of the industry in the public eye. Of late years, however, an ever increasing percentage of ethical firms have rejected the salesman method. Determined to come to grips with this condition, the Board ruled in September, 1949, that certified firms must see to it that their patients, no matter where located, must be fitted by certified fitters, not by incompetent salesmen who may receive the appliance through the mail.

This matter came out in the open at the first annual meeting of the American Board for Certification attended by several hundred delegates from the industry.

Of special interest to the medical profession is the trend toward the requirement of a prescription as a prerequisite to fitting an appliance. The inability of some physicians to prescribe for the appliance is a deterrent in some places. The Board recognizes therefore that it can raise standards only so fast as conditions in both the medical profession and the industry itself permit.

Another aspect receiving attention is that of professional schooling and training. To date the industry has taught chiefly through the apprentice system. But the time is overdue for training schools to produce new personnel to take over as the current personnel leaves. A strong Educational Committee under the chairmanship of Dr. George Young, Assistant Director, Mellon Institute, Pittsburgh, has developed a curriculum and plans for future training schools for prosthetists and orthotists. The Board's educational requirements will be increased as these plans come into effect.

Interested physicians may secure a Registry of Certified Firms and Fitters, or other information, from the American Board for Certification, 336 Washington Building, Washington 5, D. C.

The Council on Physical Medicine and Rehabilitation has authorized publication of the following reports.

RALPH E. DE FOREST, M.D., *Secretary.*

JOHNSON RECORDING OSCILLOMETER ACCEPTED

Manufacturer: W. M. Welch Manufacturing Company, 1515 Sedgwick St., Chicago 10.

The Johnson Recording Oscillometer is a device for making permanent optical recordings of the vascular pulsations in the arms, legs, neck, and head. The member may be enclosed in a rigid-walled compartment (as in the procedure of finger plethysmography familiar to the physiologist) or encircled by an inflatable cuff (as is the arm in sphygmomanometry). The pulsations are thus translated into movements of the confined air, which are transmitted by tubing to a small glass chamber in which a small amount of alcohol oscillates in the path of a beam of light. These oscillations are photographed.

Johnson Recording Oscillometer

The instrument is housed in a wooden case that is provided with a handle for carrying and measures 31 by 51.5 by 25.5 cm. (12¼ by 22¼ by 10 in.). It weighs 20.4 kg. (37 lb.). The shipping weight is 31.7 kg. (70 lb.).

The following accessories, not included in the shipping weight, are available: Graph paper (plain, #8502); graph paper (with physician's name, #8502H); mounting sheets; adaptor for projector; transmitting mechanism; table with casters (#8502T).

The device requires a source of 60-cycle alternating current at 115 volts. The power consumption is 95 watts.

Evidence obtained from sources acceptable to the Council indicated that this instrument provides a convenient method for obtaining pulse-wave recordings as an aid in the diagnosis of cardiovascular disease. The Council on Physical Medicine and Rehabilitation voted to include the Johnson Recording Oscillometer in its list of accepted devices.

TONEMASTER HEARING AID, CAMEO MODEL, ACCEPTED

Tonemaster Hearing Aid
Cameo Model

Manufacturer: Tonemaster, Inc., 400 S. Washington St., Peoria 2, Ill.

The Tonemaster Hearing Aid, Cameo Model, is an electrical instrument housed in a plastic and metal case that measures 29 by 65 by 73 mm. It is equipped with an air conduction receiver and a plastic-coated receiver cord, and the total weight with batteries is 149 gm.

Tests in a laboratory acceptable to the Council showed that this instrument satisfied the minimum requirements of the Council for acceptable hearing aids. The Council on Physical Medicine and Rehabilitation voted to include the Tonemaster Hearing Aid, Cameo Model, in its list of acceptable devices.

HOSPITAL SERVICE IN THE UNITED STATES

THIRTY-FIRST ANNUAL PRESENTATION OF HOSPITAL DATA BY THE COUNCIL ON MEDICAL EDUCATION AND HOSPITALS OF THE AMERICAN MEDICAL ASSOCIATION

By F. H. Arestad, M.D., and Mary A. McGovern

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The present report of the Council on Medical Education and Hospitals reveals again a continued increase in the volume of hospital service in the United States. Most striking, perhaps, is the reported total of 18,237,118 patients admitted for hospital care in 1951, as compared with 17,023,513 the previous year. This represents an admission rate of one new patient every 1.7 seconds. There was also a new high in the number of hospital births, which in the last year totaled 2,999,371, or one live baby every 10.7 seconds. The highest previous total was 2,837,139 in 1947. The present bed capacity of 1,529,988 shows an increase of 73,076, while the average daily census of 1,293,653 is 50,876 more than was recorded in 1950. This indicates further that in the 12 month period covered in the present survey the hospitals registered by the American Medical Association gave a total of 472,183,345 days of patient care.

SUMMARY OF HOSPITAL DATA—1951

All Registered Hospitals		General Hospitals	
Number	6,637	Number	4,890
Bed capacity	1,529,988	Bed capacity	640,207
Bassinets	92,036	Bassinets	88,505
Patients admitted	18,237,118	Patients admitted	17,065,821
Births	2,999,371	Births	2,923,509
Average daily census	1,293,653	Average daily census	470,692
Patient days	472,183,345	Patient days	171,802,580

The 1951 report describes the scope of the present hospital survey and gives (1) statistical and other descriptive material on the number, size, and classification of hospitals, bed capacity, number of patients admitted, hospital births, percentage of beds occupied, average daily census, and total patient days; (2) information on professional and auxiliary nursing personnel, schools of nursing education, and student enrollment; (3) data on special services, including x-ray, laboratory, and outpatient departments; (4) information on general practice sections in hospitals; (5) a report on the number and types of hospitals utilizing the Standard Nomenclature of Diseases and Operations; and (6) a general report on the technical schools approved by the American Medical Association in the fields of medical technology, x-ray technique, physical therapy, occupational therapy, and medical record library science.

The lists of hospitals and technical schools included in THE JOURNAL in previous years have been revised and published as a separate supplement and will be distributed to all registered hospitals, medical schools, officers of the American Medical Association, members of the House of Delegates, members of the Board of Trustees, secretaries of state medical associations, editors of state medical journals, state boards of medical examiners, state and national hospital organizations, state boards of nurse examiners, state health officers, medical departments of the federal government, allied technical associations, and other agencies and to individual physicians on request.

As in previous years, the list of registered hospitals will contain special symbols designating the hospitals approved for intern and residency training, the hospitals accredited by the American College of Surgeons as meeting unconditionally the requirements for general standardization, and hospitals conducting schools of professional nursing education or affiliated training pro-

grams accredited by the respective state boards of nurse examiners.

The preparation of this report, as well as the lists of hospitals and technical schools, has been made possible only through the continued cooperation of the hospitals and schools represented. The Council, therefore, wishes to express its appreciation to the medical departments of the Army, Air Force, Navy, U. S. Public Health Service, Veterans Administration, Federal Security Agency, the administrators of individual hospitals, directors of technical schools, and all others who have generously assisted in the present survey.

TABLE A.—*Summary of Growth of Hospitals, 1909 to 1951*

Year	Federal Hospitals		State Hospitals		All Other Hospitals		Total	
	Number	Capacity	Number	Capacity	Number	Capacity	Number	Capacity
1909	71	8,827	232	189,049	4,056	223,189	4,359	421,065
1914	93	12,602	294	232,834	4,650	287,045	5,047	532,481
1918	110	18,815	303	262,254	4,910	331,182	5,323	612,251
1923	220	53,869	601	302,208	6,009	399,645	6,830	755,722
1928	294	61,765	595	369,759	5,963	461,410	6,852	892,934
1931	291	69,170	576	419,282	5,746	485,663	6,613	974,115
1932	301	74,151	568	442,601	5,693	497,602	6,562	1,014,354
1933	295	75,635	557	459,646	5,585	491,765	6,437	1,027,046
1934	313	77,865	544	473,035	5,477	497,201	6,334	1,048,101
1935	316	83,353	526	483,994	5,404	507,792	6,246	1,075,139
1936	323	84,234	524	503,306	5,342	509,181	6,189	1,096,721
1937	329	97,951	522	508,913	5,277	517,684	6,128	1,124,548
1938	330	92,248	523	541,279	5,313	527,853	6,166	1,161,380
1939	329	96,338	523	560,575	5,374	538,113	6,226	1,195,026
1940	336	108,928	521	572,079	5,434	545,238	6,291	1,226,245
1941	428	179,202	530	600,320	5,400	544,859	6,358	1,324,381
1942	474	220,938	530	606,437	5,341	556,452	6,345	1,383,827
1943	827	476,673	531	610,115	5,297	562,466	6,655	1,649,254
1944	798	551,135	539	609,025	5,274	569,785	6,611	1,729,945
1945	705	546,384	549	619,642	5,257	572,918	6,511	1,738,944
1946	464	264,486	557	628,363	5,259	575,865	6,280	1,468,714
1947	401	213,204	563	626,648	5,312	585,370	6,276	1,425,222
1948	372	185,098	567	648,386	5,396	590,036	6,335	1,423,520
1949	361	182,254	573	656,611	5,638	600,165	6,572	1,439,030
1950	355	186,793	552	665,019	5,523	605,100	6,430	1,456,912
1951	388	216,939	554	683,376	5,695	629,673	6,637	1,529,988

Scope of Survey

Represented in the present annual survey are 6,637 hospitals in the United States, 25 in Alaska, 6 in the Canal Zone, 2 in Guam, 37 in Hawaii, 43 in Puerto Rico, and 4 in the Virgin Islands. All of these appear in the supplemental list of registered hospitals, but the statistical report as here presented is limited solely to the 6,637 hospitals located within the Continental United States. Shown in this list are 1,325 hospitals approved by the American Medical Association for the training of interns and/or resident physicians. These include 865 approved for internships and 1,131 approved for residency training. A more detailed report on these educational programs will appear in the Internship and Residency Number of THE JOURNAL, Sept. 27, 1952. By special designations it is also shown that 2,740 hospitals are fully accredited under the general standardization program of the American College of Surgeons and that 1,106 have accredited professional schools of nursing aside from the 230 that offer acceptable affiliated training.

TABLE B.—*Number of Hospitals According to Size*

Bed Capacity	General Hospitals	Nervous and Mental	Tuberculosis	Other Hospitals	Total Number
25 and under	1,025	32	22	156	1,235
26-50	1,191	81	59	201	1,532
51-100	1,030	80	114	200	1,424
101-200	850	49	95	92	1,086
201-300	380	24	57	38	499
301 and over	414	330	83	34	861
Totals	4,890	596	430	721	6,637

Changes, corrections, and additions have been made in the registered list up to the date of publication, and, therefore, totals derived from the list itself may show slight variations from those presented in the tables of the statistical report.

Included in the present survey are also 496 schools of medical technology approved by the American Medical Association, 310 schools for x-ray technicians, 31 schools of physical therapy, 25 schools of occupational therapy, and 21 schools for medical record librarians.

Number, Size, and Classification of Hospitals

The registration of hospitals is carried out in accordance with standards officially adopted by the House of Delegates of the American Medical Association. These requirements, which appear under the title "Essentials of a Registered Hospital," were published in THE JOURNAL, May 7, 1949, pages 35-36. In the report of 1950 the number of registered hospitals was 6,430. Since that time, however, 411 additional registrations have been recorded, whereas 204 hospitals have been closed or otherwise removed from the registered list because of failure to supply the essential information requested in the annual hospital questionnaire. Thus, with a net increase of 207, the present registered list has been expanded to 6,637. These are all included in the hospital supplement, which shows the name and location of each institution, the control, type of service offered, number of beds and bassinets, total births during the year, number of patients admitted, and the average daily census.

The classification of hospitals by size may be observed in table B, where variations in bed capacity have been recorded in relation to general hospitals, psychiatric in-

TABLE C.—*Summary of Hospital Service Classified by Control*

	Hospitals	Beds	Bassinets	Admissions	Average Census	Births
Governmental						
Federal	388	216,939	2,907	1,489,581	167,792	85,935
State	554	683,376	2,043	767,599	645,672	68,477
County	633	107,458	5,981	1,066,562	88,931	170,425
City	377	77,736	6,027	1,257,575	61,123	196,733
City-county	80	12,211	1,464	285,098	9,554	50,722
Total governmental	2,032	1,097,720	18,422	4,866,415	973,072	572,292
Nongovernmental						
Church	1,116	154,053	28,292	5,152,206	117,572	983,760
Nonprofit associations	2,121	225,903	36,672	6,695,804	168,577	1,197,648
Total nonprofit	3,237	379,956	64,964	11,848,010	286,149	2,181,408
Individual and partnership	966	27,527	5,310	820,493	16,564	134,539
Corporations (profit unrestricted)	402	24,785	3,340	702,200	17,868	111,132
Total proprietary	1,368	52,312	8,650	1,522,693	34,432	245,671
Total nongovernmental	4,605	432,268	73,614	13,370,703	320,581	2,427,079
Total all hospitals	6,637	1,529,988	92,036	18,237,118	1,293,653	2,999,371

TABLE D.—*Summary of Hospital Data According to Type of Service*

	Hospitals	Beds	Bassinets	Admissions	Average Census	Births
General	4,890	640,207	88,505	17,065,821	470,692	2,923,509
N & M	596	728,187	192	307,010	697,521	572
Tuberculosis	430	88,379	100	107,181	73,588	3,492
Maternity	90	4,632	2,946	105,663	2,953	71,343
Industrial	32	2,887	2	60,951	1,890	4
E. E. N. T.	53	2,595	...	114,516	1,502	...
Children's	44	5,133	111	135,043	3,438	2
Orthopedic	82	6,708	25	33,009	5,209	1
Isolation	40	9,516	63	101,026	5,097	50
Conv. and rest	120	7,115	11	38,057	5,078	34
Institutions	183	19,905	75	134,414	13,098	238
All other hospitals	77	14,774	6	34,427	13,587	126
Total all hospitals	6,637	1,529,988	92,036	18,237,118	1,293,653	2,999,371

stitutions, tuberculosis sanatoriums, and other hospitals. In this connection, it will be found that the various size groups are practically as described in the previous report, inasmuch as 63% of the registered hospitals report 100 beds or less, 24% have 101 to 300 beds, and 13% have 300 beds or more. The same pattern applies to the general hospitals, but in the psychiatric and tuberculosis fields a greater proportion of large institutions will be found. At present 34% of the general hospitals have more than 100 beds, whereas the corresponding ratios in the psychiatric and tuberculosis institutions are 68 and 55% respectively.

TABLE E.—*Governmental and Nongovernmental Hospital Service*

	Hospitals	Beds	Bassinets	Admissions	Average Census	Births
Governmental						
General	1,119	273,335	17,565	4,292,253	200,035	558,580
N & M	302	706,924	174	230,414	680,288	423
Tuberculosis	325	78,645	98	92,953	65,684	3,490
Other special	58	12,382	516	126,667	7,009	9,752
Institutions	168	26,434	69	124,128	20,056	47
Total governmental	2,632	1,097,720	18,422	4,866,415	973,072	572,292
Nongovernmental						
General	3,771	366,872	70,940	12,773,568	270,657	2,364,929
N & M	234	21,263	18	76,596	17,233	149
Tuberculosis	105	9,734	2	14,228	7,904	2
Other special	403	26,154	2,642	461,598	18,158	61,682
Institutions	92	8,245	12	44,713	6,629	317
Total nongovernmental	4,605	432,268	73,614	13,370,703	320,581	2,427,079
Total all hospitals	6,637	1,529,988	92,036	18,237,118	1,293,653	2,999,371

TABLE F.—*Summary of Federal Hospital Service in the United States According to Type of Service and Governmental Agencies Concerned from the 1951 Census of Hospitals Registered by the American Medical Association*

Type	Hospitals	Beds	Bassinets	Admissions	Average Census	Births
U. S. Army						
General	60	41,078	1,022	489,107	29,346	32,365
U. S. Air Force						
General	32	8,857	506	141,414	4,854	13,535
U. S. Navy						
General	35	28,021	846	244,847	18,069	29,756
U. S. Public Health Service						
General	18	4,899	36	60,386	3,954	917
N & M	2	2,400	...	5,072	2,285	1
TB	2	592	...	721	507	.....
Other special	2	1,000	13	12,773	238	7
Institutions	18	1,402	6	11,581	772	19
Totals	42	10,293	55	90,533	7,756	944
Veterans Administration						
General	97	51,773	...	396,275	39,059	1
N & M	35	54,468	...	40,711	50,508	1
TB	20	10,253	...	18,731	7,596	.....
Totals	152	116,494	...	455,717	97,163	2
Indian Affairs						
General	51	2,367	395	48,513	1,441	6,017
TB	5	779	...	2,671	668	.....
Institutions	3	113	...	715	19	.....
Totals	59	3,259	395	51,899	2,128	6,017
Other Federal						
General	4	602	80	11,869	491	3,307
N & M	1	6,785	3	1,412	6,780	9
Institutions	3	1,550	...	2,783	1,205	.....
Totals	8	8,937	83	16,064	8,476	3,316
Total all Federal Hospitals	388	216,939	2,907	1,489,581	167,792	85,935

The control classification outlined in table C shows that 2,032, or 30.6%, of the registered hospitals operate under governmental control, whereas 4,605, or 69.4%, are in the nongovernmental group. Last year the corresponding ratios were 29.7 and 70.3%. At present 19% of the governmental hospitals are classified as federal, 27% as state institutions, 31% county, 18% municipal, and 4% city-county. In table E it may be observed that 55% of the governmental hospitals are general in type, while 18% operate as psychiatric institutions, 16% as tuberculosis hospitals, and 11% under other service classifications. Further reference to table G will show that the general hospitals predominate in all governmental divisions except the state group where, as in the previous report, 51% of the hospitals are devoted to psychiatric care and only 10% to general hospitalization.

TABLE G.—*Summary of Hospital Service in the United States According to Type of Service and Agencies Concerned from the 1951 Census of Hospitals Registered by the American Medical Association*

Type	Hospitals	Beds	Bassinets	Admissions	Average Census	Births
U. S. Totals	6,637	1,529,988	92,036	18,237,118	1,293,653	2,999,371
Federal						
General	297	137,597	2,885	1,392,411	97,214	85,898
N & M	38	63,653	3	47,195	59,573	11
TB	27	11,624	...	22,123	8,771	.....
Other Special	2	1,000	13	12,773	238	7
Institutions	24	3,065	6	15,079	1,996	19
Totals	388	216,939	2,907	1,489,581	167,792	85,935
State						
General	56	20,971	1,749	403,253	16,118	66,947
N & M	282	619,151	163	174,815	597,927	411
TB	89	29,349	10	27,159	24,137	54
Other Special	22	4,948	64	74,694	2,857	1,043
Institutions	105	8,957	57	87,678	4,633	22
Totals	554	683,376	2,043	767,599	645,672	68,477
County						
General	391	50,254	5,572	1,011,626	87,756	161,707
N & M	40	23,290	8	8,067	22,104	.....
TB	171	24,739	3	24,695	21,026	30
Other Special	10	2,955	398	14,418	2,344	8,688
Institutions	21	6,220	...	7,756	5,701	.....
Totals	633	107,458	5,981	1,066,562	88,931	170,425
City						
General	307	54,139	5,920	1,204,663	40,962	193,306
N & M	2	830	...	337	684	1
TB	27	11,171	85	17,099	10,256	3,406
Other Special	23	3,404	16	21,861	1,495	14
Institutions	18	8,192	6	13,615	7,726	6
Totals	377	77,736	6,027	1,257,575	61,123	196,733
City-County						
General	68	10,374	1,439	280,390	7,985	50,722
N & M	...	.....	...	.....	.....	.....
TB	11	1,762	...	1,877	1,494	.....
Other Special	1	75	25	2,921	75	.....
Institutions	...	.....	...	.....	.....	.....
Totals	80	12,211	1,464	285,098	9,554	50,722
Church						
General	997	143,962	27,240	5,084,884	110,146	963,135
N & M	23	3,461	4	8,524	2,792	116
TB	14	1,615	...	2,837	1,403	.....
Other Special	67	3,657	1,041	53,343	2,184	20,305
Institutions	15	1,358	7	2,618	1,047	204
Totals	1,116	154,053	28,292	5,152,206	117,572	983,760
Nonprofit						
General	1,722	186,770	35,289	6,288,084	138,354	1,161,241
N & M	45	7,433	6	16,092	6,410	1
TB	68	6,911	2	9,659	5,509	2
Other Special	222	18,260	1,370	346,031	12,945	36,291
Institutions	64	6,529	5	35,938	5,359	113
Totals	2,121	225,903	36,672	6,695,804	168,577	1,197,648
Individual and Partnership						
General	775	20,110	5,181	760,162	11,062	130,452
N & M	79	3,984	4	21,497	3,019	.....
TB	17	708	...	1,000	551	.....
Other Special	86	2,553	125	34,081	1,846	4,087
Institutions	9	172	...	3,753	86	.....
Totals	966	27,527	5,310	820,493	16,564	134,539
Corporations						
General	277	16,030	3,230	640,438	11,095	110,101
N & M	87	6,385	4	30,483	5,012	32
Tuberculosis	6	500	...	732	441	.....
Other Special	28	1,684	106	28,143	1,183	999
Institutions	4	186	...	2,404	137	.....
Totals	402	24,785	3,340	702,200	17,868	111,132
Total all Hospitals	6,637	1,529,988	92,036	18,237,118	1,293,653	2,999,371

In the nongovernmental group, consisting of 4,605 hospitals, 2,121 are listed as nonprofit associations, while 1,116 other nonprofit hospitals appear under church control. Together these hospitals constitute 70% of the nongovernmental institutions, whereas the remaining 30% are represented by 1,368 proprietary hospitals, in-

TABLE 1.—HOSPITAL FACILITIES BY STATES AND BY CONTROL: A. GOVERNMENT HOSPITALS

Marginal No.		Federal					State					County					City					City-County					Total Governmental					Marginal No.
		Hospitals	Beds	Bassinets	Patients Admitted	Average Census	Hospitals	Beds	Bassinets	Patients Admitted	Average Census	Hospitals	Beds	Bassinets	Patients Admitted	Average Census	Hospitals	Beds	Bassinets	Patients Admitted	Average Census	Hospitals	Beds	Bassinets	Patients Admitted	Average Census	Hospitals	Beds	Bassinets	Patients Admitted	Average Census	
1	Alabama	8	5,136	60	29,695	4,207	9	8,740	114	26,591	8,389	6	399	30	5,100	332	4	336	67	14,692	204	8	824	160	34,909	555	35	15,435	431	110,987	13,687	1
2	Arizona	18	2,098	125	22,210	1,575	3	1,805	...	1,323	1,701	8	911	69	15,143	711	3	47	12	905	17	..	...	...	.....	...	32	4,861	206	39,581	4,004	2
3	Arkansas	6	4,871	28	32,795	3,494	4	6,546	38	11,265	6,377	9	367	99	9,010	125	6	322	95	14,005	167	..	...	...	.....	...	25	12,106	260	67,075	10,163	3
4	California	31	23,800	357	189,138	17,528	17	41,820	31	32,476	39,231	59	21,480	905	236,099	17,645	3	111	36	4,115	53	3	2,335	51	25,579	2,349	113	89,546	1,380	487,407	76,806	4
5	Colorado	8	5,780	34	22,005	4,275	8	6,918	20	8,874	6,470	10	390	101	12,830	235	1	90	16	3,180	62	2	482	30	8,563	404	29	13,660	201	55,452	11,446	5
6	Connecticut	3	409	...	4,537	292	14	14,118	5	8,279	13,063	..	.....	...	.....	.....	3	497	16	4,180	259	..	...	...	.....	...	20	15,024	21	16,996	13,614	6
7	Delaware	1	300	...	2,108	224	6	2,790	7	1,535	2,771	..	.....	...	.....	.....	..	...	...	.....	.....	..	...	...	.....	...	7	3,090	7	3,643	2,995	7
8	District of Columbia	7	9,854	111	35,640	10,040	..	.....	...	.....	.....	..	.....	...	.....	.....	4	3,363	129	19,770	2,757	..	...	...	.....	...	11	13,217	240	55,410	12,797	8
9	Florida	11	3,691	155	43,810	2,557	10	10,023	20	11,764	8,736	15	1,758	236	50,035	1,231	10	1,129	214	41,975	801	3	167	29	4,759	63	49	16,768	654	152,343	13,388	9
10	Georgia	9	4,956	67	60,684	3,605	6	13,965	12	26,839	12,717	15	1,359	291	47,925	860	4	797	126	30,658	564	12	1,058	236	36,819	583	46	22,135	732	202,925	18,329	10
11	Idaho	1	250	...	2,128	180	5	2,088	...	1,707	1,929	9	383	96	10,759	160	2	40	11	1,364	21	1	30	10	850	15	18	2,791	117	16,808	2,305	11
12	Illinois	9	10,995	66	64,373	8,822	20	49,920	38	31,479	46,199	29	7,623	228	80,224	6,609	22	3,153	254	43,847	2,369	..	...	...	.....	...	80	71,691	586	219,923	63,999	12
13	Indiana	6	4,434	15	22,090	3,776	16	14,246	71	16,977	14,040	42	3,141	509	80,380	2,565	4	791	94	14,177	615	..	...	...	.....	...	68	22,612	689	133,624	20,996	13
14	Iowa	2	2,024	...	5,619	1,931	12	11,808	60	22,861	10,589	10	663	58	8,823	461	10	379	105	15,737	252	..	...	...	.....	...	34	14,874	223	53,040	13,233	14
15	Kansas	7	3,747	45	29,010	2,885	12	8,386	46	14,359	7,853	15	598	132	13,701	369	13	563	160	18,703	361	3	77	22	1,831	44	50	13,371	405	77,604	11,512	15
16	Kentucky	9	7,071	57	49,111	5,654	13	8,878	27	8,202	8,335	7	418	66	5,326	291	5	317	80	15,549	242	3	927	83	18,248	761	37	17,611	313	96,436	15,283	16
17	Louisiana	8	3,076	53	31,948	2,385	13	13,677	451	110,723	11,629	1	49	...	40	32	1	100	...	265	37	..	...	...	.....	...	23	16,902	504	142,976	14,083	17
18	Maine	2	949	...	3,622	840	6	4,812	2	1,832	4,471	..	.....	...	.....	.....	3	223	39	3,979	187	..	...	...	.....	...	11	5,984	41	8,933	5,498	18
19	Maryland	9	6,104	124	49,361	4,377	14	10,718	84	17,177	11,059	3	315	80	7,805	160	2	1,754	80	8,055	1,345	1	225	50	8,883	201	29	19,116	418	91,231	17,142	19
20	Massachusetts	12	8,125	97	40,955	6,575	27	34,026	50	18,228	33,041	7	1,261	...	1,066	966	25	6,289	513	87,435	4,783	..	...	...	.....	...	71	49,701	660	147,684	45,395	20
21	Michigan	9	5,558	14	26,167	4,499	19	26,704	43	30,739	25,117	31	11,025	104	32,824	9,400	37	4,805	674	132,069	4,342	..	...	...	.....	...	96	48,092	835	221,799	43,448	21
22	Minnesota	6	2,441	22	11,541	2,281	17	13,746	41	18,499	12,493	13	1,487	40	6,424	1,235	31	1,630	342	37,341	941	5	1,014	87	11,337	724	72	20,318	532	85,142	17,674	22
23	Mississippi	5	2,783	26	19,870	1,938	8	6,988	52	32,316	6,149	12	488	117	13,822	200	4	130	38	4,754	64	4	230	65	9,953	191	33	10,619	298	80,215	8,542	23
24	Missouri	8	3,680	26	21,300	2,703	14	16,148	13	9,481	15,560	10	719	131	10,993	398	15	5,315	313	57,939	4,472	..	...	...	.....	...	47	25,862	488	99,718	28,133	24
25	Montana	6	505	27	5,318	222	2	2,182	...	1,001	2,126	5	288	27	1,627	150	..	...	...	.....	.....	..	...	...	.....	...	13	2,975	54	7,946	2,498	25
26	Nebraska	5	1,028	24	9,699	629	9	7,250	15	7,651	6,797	5	443	44	12,692	274	5	114	35	2,697	64	..	...	...	.....	...	24	8,835	118	32,739	7,764	26
27	Nevada	4	202	21	3,486	156	1	400	...	167	374	6	551	78	12,631	356	..	...	...	.....	.....	..	...	...	.....	...	11	1,153	99	16,284	886	27
28	New Hampshire	2	350	12	3,831	228	3	3,514	...	1,119	3,364	3	192	28	2,670	118	3	124	21	3,627	67	..	...	...	.....	...	11	4,180	61	11,247	3,777	28
29	New Jersey	5	3,718	68	28,181	3,057	14	19,454	5	7,559	19,000	21	10,563	387	17,696	9,086	7	3,118	60	42,716	2,486	..	...	...	.....	...	47	36,853	520	96,152	33,629	29
30	New Mexico	11	1,204	59	12,026	958	5	1,548	11	2,663	1,446	2	129	37	2,346	29	2	102	19	5,001	59	3	157	43	4,351	60	23	3,140	169	26,387	2,552	30
31	New York	18	16,489	102	69,717	12,315	52	115,783	111	44,123	110,163	30	5,645	154	43,452	4,688	50	28,880	952	357,974	24,536	..	...	...	.....	...	150	166,797	1,319	515,266	151,702	31
32	North Carolina	6	5,187	101	41,406	3,281	14	12,623	19	12,483	11,574	26	1,795	222	36,337	1,239	3	482	103	16,016	347	3	252	50	7,207	155	52	20,339	495	113,449	16,596	32
33	North Dakota	5	471	19	5,368	245	3	3,620	2	956	3,567	..	.....	...	.....	.....	3	51	16	2,183	37	..	...	...	.....	...	11	4,142	37	8,507	3,849	33
34	Ohio	7	5,409	20	24,164	4,588	26	34,901	36	24,536	32,715	27	4,283	183	28,732	3,564	17	3,578	391	67,374	2,613	2	108	32	5,012	86	79	48,279	662	149,818	43,516	34
35	Oklahoma	13	1,848	108	26,972	1,203	13	11,507	64	17,797	10,543	6	349	86	6,302	128	15	615	183	25,766	345	..	...	...	.....	...	47	14,319	441	76,837	12,219	35
36	Oregon	3	1,260	6	5,252	1,067	6	5,317	36	10,930	5,120	6	275	59	7,978	155	2	111	14	1,288	29	..	...	...	.....	...	17	6,963	115	25,448	6,371	36
37	Pennsylvania	12	9,108	58	40,824	7,760	39	50,785	206	51,843	47,581	11	3,189	...	2,908	2,795	6	3,843	76	23,658	2,609	..	...	...	.....	...	68	66,925	340	119,233	60,745	37
38	Rhode Island	3	1,202	46	11,401	856	4	5,832	24	2,486	5,307	..	.....	...	.....	.....	1	255	...	3,035	117	..	...	...	.....	...	8	7,289	70	16,922	6,280	38
39	South Carolina	4	2,509	58	29,047	1,828	3	7,218	2	2,640	7,045	16	1,824	308	51,247	1,267	2	277	42	10,107	164	2	362	36	14,449	326	27	12,190	446	107,490	10,630	39
40	South Dakota	9	1,292	44	6,683	1,114	4	2,920	...	893	2,605	2	55	17	1,474	27	3	112	27	2,275	40	..	...	...	.....	...	18	4,379	88	11,325	3,786	40
41	Tennessee	7	4,902	26	32,230	4,101	10	8,590	8	5,602	8,059	11	2,305	94	15,480	2,053	6	1,182	176	37,707	946	6	1,150	159	26,445	910	40	18,228	465	117,462	16,069	41
42	Texas	23	15,344	259	122,589	11,162	19	19,186	34	33,088	20,412	60	2,327	534	80,359	2,110	15	894	185	36,107	540	15	2,441	264	57,945	1,906	132	40,192	1,276	330,088	36,130	42
43	Utah	2	228	6	3,458	173	3	2,152	...	630	2,063	4	336	59	7,136	211	3	67	36	2,067	31	..	...	...	.....	...	12	2,783	101	13,291	2,478	43
44	Vermont	1	250	...	3,139	184	5	1,667	...	873	1,859	..	.....	...	.....	.....	..	...	...	.....	.....	..	...	...	.....	...	6	1,917	...	4,012	2,043	44
45	Virginia	14	9,507	201	90,215	6,760	14	14,603	184	42,500	14,221	1	25	10	660	14	4	567	36	5,247	480	1	41	12	1,849	28	34	24,743	443	140,471	21,503	45
46	Washington	17	6,138	115	53,055	4,572	8	9,593	15	7,422	8,809	19	3,333	128	26,738	2,727	..	...	...	.....	.....	2	275	25	5,120	172	46	19,339	283	92,335	16,280	46
47	West Virginia	5	1,631	6	7,403	1,120	12	6,678	16	6,464	6,193	3	112	17	2,874	84	3	365	69	16,577	338	..	...	...	.....	...	23	8,786	108	33,318	7,735	47
48	Wisconsin	7	3,630	19	18,020	2,494	9	6,083	30	18,891	5,722	51	13,796	81	33,778	13,308	14	807	167	20,661	354	1	56	20	1,041	21	82	24,372	317	92,391	21,899	48
49	Wyoming	4	1,395	20	16,380	1,126	3	1,091	...	306	1,088	7	719	134	23,616	443	1	11	5	798	6	..	...	...	.....	...	15	3,216	159	41,100	2,663	49
	Totals (1951)	388	216,939	2,907	1,489,581	167,792	554	683,376	2,043	767,599	645,672	633	107,458	5,981	1,066,562	88,931	377	77,736	6,027	1,257,575	61,123	80	12,211	1,464	285,098	9,554	2,032	1,097,720	18,422	4,866,415	973,072	
	(1950)	355	186,793	2,419	1,127,937	145,397	552	665,019	2,034	791,863	632,283	572	103,826	5,186	970,463	86,825	363	69,731	5,675	1,181,415	57,809	70	11,672	1,299	245,692	9,147	1,912	1,037,041	16,613	4,317,370	931,461	
	(1949)	361	182,254	2,432	1,164,096	144,950	573	656,611	2,105	791,671	618,614	561	103,209	4,801	898,955	85,650	373	71,779	5,877	1,190,285	58,160	69	11,302	1,170	213,778	8,469	1,937	1,025,155	16,385	4,258,785	915,843	
	(1948)	372	185,098	2,843	1,185,874	147,159	567	648,386	2,056	817,630	611,410	530	101,327	4,397	851,655	82,460	368	73,797	5,867	1,222,070	58,075	63	11,159	1,094	213,262	8,465	1,900	1,019,767	15,757	4,290,491	907,569	
	(1947)	401	213,204	2,444	1,285,126	168,133	563	626,648	1,932	737,402	585,747	526	101,402	4,352	784,499	82,568	369	78,184	5,968	1,208,546	60,498	58	10,767	1,028	188,771	7,657	1,917	1,030,205	15,724	4,204,344	904,603	
	(1946)	464	264,486	2,692	1,949,711	213,246	557	628,363	1,876	648,538	579,782	514	102,071	4,315	704,772	79,758	363	76,534	5,836	1,109,573	57,283	64	11,280	1,009	185,569	7,863	1,962	1,082,734	15,728	4,598,163	937,932	
	(1945)	705	546,384	3,923	4,047,949	391,985	549	619,642	1,746	559,352	580,783	508	102,121	4,294	614,468	77,510	359	77,365	5,657	1,014,874	56,418	62	11,206	966	162,470	7,768	2,183	1,356,718	16,586	6,399,113	1,114,414	
	(1944)	798	551,135	3,462	4,287,271	303,875	539	609,025	1,690	556,224	570,441	504	102,544	3,889	571,581	77,856	365	79,687	5,491	996,423	57,417	56	9,887	757	133,721	6,594	2,262	1,352,278	15,289	6,545,220	1,016,183	
	(1943)	827	476,673	2,396	4,032,607	268,746	531	610,115	1,623	543,258	571,576	511	100,151	3,763	581,706	77,789	354	77,879	5,215	942,628	57,848	61	11,321	842	162,628	7,773	2,284	1,276,139	13,839	6,262,827	983,732	
	(1942)	474	220,938	1,206	1,675,722	147,094	530	606,437	1,618	601,481	566,457	505	98,997	3,512	606,390	76,948	354	79,252	4,847	999,687	60,982	61	10,157	645	126,395	7,157	1,924	1,015,781	11,828	4,009,675	858,638	
	(1941)	428	179,202	1,006	1,268,112	118,890	530	600,320	1,572	620,231	561,620	512	98,227	3,288	643,740	83,214	337	78,060	5,045	999,559	61,019	57	9,702	583	130,960	7,149	1,864	965,511	11,494	3,662,602	831,892	
	(1940)	336	108,928	1,089	557,137	86,604	521	572,079	1,347	583,274	539,994	514	102,340	3,097	615,247	87,029	332	79,045	4,390	986,859	63,644	64	11,297	636	126,487	7,401	1,767	873,689	10,559	2,869,004	784,672	
	(1939)	329	96,338	823	477,417	80,692	523	560,575	1,234	588,997	527,900	501	100,976	2,748	589,280	86,177	320	77,231	4,210	951,295	61,766	67	10,026	589	127,386	7,513	1,740	845,146	9,604	2,734,375	764,048	
	(1938)	330	92,348	772	445,891	75,470	523	541,279	1,127	549,637	512,839	490	96,621	2,581	552,066	80,262	317	75,180	4,089	928,924	61,006	68	9,808	542	130,762	7,110	1,728	815,136	9,111	2,607,280	736,687	
	(1937)	329	97,951	734	439,480	80,819	522	508,913	1,111	511,809	485,891	484	93,379	2,641	549,332	80,575	324	79,368	3,937	897,685	64,928	63	9,138	499	111,619	6,667	1,722	788,749	9,277	2,509,925	718,880	
	(1936)	323	84,234	675	426,570	68,752	524	503,306	1,136	534,652	478,778	484	87,541	2,388	497,706	76,277	332	78,950	3,947	885,058	65,508	61	9,809	496	108,873	7,520	1,724	763,840	8,642	2,452,859	696,835	
	(1935)	316	83,353	604	382,980	64,795	526	483,994	1,186	513,345	462,070	490	90,904	2,375	476,275	79,280	328	73,322	3,742	809,054	60,751	64	10,139	510	111,398	8,025	1,724	741,712	8,417	2,293,052	674,921	
	(1934)	313	77,865	560	324,354	58,209	544	473,035	1,154	474,539	447,014	496	83,919	2,404	453,425	71,157	328	71,931	3,680	792,887	59,891	68	11,138	548	113,860	8,729	1,749	717,888	8,346	2,159,065	645,000	

cluding 420 corporations unrestricted as to profit and 966 institutions operating under individual or partnership control. On a functional basis 82% of the nongovernmental hospitals are organized for general care, 5% for psychiatric hospitalization, 2% for tuberculosis, and 11% for other services. It is apparent, therefore, that the governmental and nongovernmental hospitals differ widely in their service classifications.

The general hospitals, totaling 4,890, constitute by far the largest group, as they represent 74% of all hospitals registered by the American Medical Association. Considered on a numerical basis, the psychiatric division is next in size. It lists only 596 institutions, or 9% of all registered hospitals, yet has a greater bed capacity and average daily patient load than is found in any other group. The tuberculosis sanatoriums, numbering 430, comprise 6% of the registered hospitals, whereas the remaining group shown in table D represents approximately 11%. The expansion of hospital service in the United States since 1909 is shown in table A. Reference should also be made to table F, which gives information on federal hospitals and to table G, which summarizes the statistical data on all registered hospitals in accordance with type of service and control.

TABLE 1.—HOSPITAL FACILITIES BY STATES AND BY CONTROL: B. NONPROFIT ORGANIZATIONS

Marginal No.		Church Related (Nonprofit)					Nonprofit Associations					Total Nonprofit					Marginal No.
		Hospitals	Beds	Bassinets	Patients Admitted	Average Census	Hospitals	Beds	Bassinets	Patients Admitted	Average Census	Hospitals	Beds	Bassinets	Patients Admitted	Average Census	
1	Alabama	11	1,366	249	46,557	908	17	1,717	240	45,226	1,255	28	3,083	489	91,783	2,163	1
2	Arizona	5	809	154	30,871	623	23	1,311	199	37,704	783	28	2,120	353	68,575	1,406	2
3	Arkansas	11	1,257	252	52,495	939	12	919	112	26,748	535	23	2,176	364	79,243	1,474	3
4	California	51	7,490	1,639	318,487	6,062	101	10,530	1,585	373,322	8,168	152	18,020	3,224	691,809	14,230	4
5	Colorado	32	3,899	590	118,485	2,521	29	2,150	185	40,587	1,431	61	5,549	775	159,072	3,952	5
6	Connecticut	6	1,894	298	61,794	1,426	37	6,315	962	176,989	4,770	43	8,209	1,260	238,783	6,196	6
7	Delaware	1	115	30	3,119	70	7	1,164	199	34,843	779	8	1,279	229	37,962	849	7
8	District of Columbia	5	1,279	238	49,484	1,009	10	1,746	314	51,906	1,292	15	3,025	552	101,390	2,301	8
9	Florida	12	1,654	358	53,149	1,085	41	2,846	488	81,167	1,770	53	4,500	846	134,316	2,855	9
10	Georgia	7	902	137	31,655	645	25	2,334	361	87,836	1,732	32	3,236	498	119,491	2,377	10
11	Idaho	12	979	244	36,996	616	12	447	125	13,158	232	24	1,426	369	50,154	848	11
12	Illinois	90	14,621	2,534	461,379	11,676	113	13,629	2,188	399,232	10,231	203	28,250	4,722	860,611	21,907	12
13	Indiana	30	5,275	1,043	198,793	4,232	23	1,856	374	69,826	1,424	53	7,131	1,417	268,619	5,656	13
14	Iowa	45	5,639	952	183,348	4,371	26	1,481	341	48,708	1,007	71	7,090	1,293	232,056	5,378	14
15	Kansas	44	4,245	805	140,338	3,162	26	1,275	217	32,687	860	70	5,520	1,022	173,025	4,022	15
16	Kentucky	23	2,864	471	99,116	2,096	33	2,243	382	70,324	1,520	56	5,107	853	169,440	3,616	16
17	Louisiana	15	2,213	385	89,259	1,582	21	1,852	239	63,211	1,176	36	4,065	624	152,470	2,758	17
18	Maine	7	562	111	17,334	408	28	1,985	383	61,156	1,407	35	2,547	494	78,490	1,815	18
19	Maryland	9	1,821	234	46,952	1,394	34	5,083	616	118,601	3,911	43	6,904	850	165,553	5,305	19
20	Massachusetts	18	3,196	558	88,199	2,518	110	12,421	2,282	342,274	9,032	128	15,617	2,840	430,473	11,550	20
21	Michigan	36	5,627	1,310	218,263	4,387	97	9,992	1,741	330,470	7,964	133	15,619	3,051	548,733	12,351	21
22	Minnesota	42	4,829	838	176,439	3,887	71	5,052	886	147,432	3,661	113	9,881	1,724	323,871	7,548	22
23	Mississippi	6	697	122	32,834	608	32	1,520	305	66,044	941	38	2,217	427	98,878	1,549	23
24	Missouri	40	6,677	1,147	197,062	5,587	43	4,336	580	110,346	3,307	83	11,013	1,727	307,408	8,894	24
25	Montana	26	2,281	436	71,513	1,796	12	503	123	15,668	307	38	2,784	559	87,181	2,103	25
26	Nebraska	37	3,339	622	101,995	2,276	19	882	198	28,681	564	56	4,221	820	130,676	2,840	26
27	Nevada	2	152	28	5,838	99	2	58	15	1,496	26	4	210	43	7,334	125	27
28	New Hampshire	4	445	77	13,692	327	24	1,652	357	49,278	1,030	28	2,097	434	62,970	1,357	28
29	New Jersey	18	4,005	648	109,128	2,792	81	10,326	1,839	301,275	7,879	100	14,355	2,496	411,678	10,685	29
30	New Mexico	15	962	216	33,767	665	8	360	51	8,072	166	22	1,298	258	40,564	817	30
31	New York	70	12,520	1,877	302,989	9,728	221	36,090	4,788	905,758	28,302	291	48,610	6,665	1,208,747	38,030	31
32	North Carolina	13	1,520	352	52,205	1,062	86	7,129	1,388	284,161	5,017	99	8,649	1,740	336,366	6,079	32
33	North Dakota	27	1,960	401	66,159	1,290	9	616	119	18,302	366	36	2,576	520	84,461	1,656	33
34	Ohio	53	9,474	1,654	327,957	7,644	92	10,945	1,963	396,137	8,855	145	20,419	3,617	724,094	16,499	34
35	Oklahoma	16	1,829	390	63,194	1,315	17	1,118	196	37,029	747	33	2,947	586	100,223	2,062	35
36	Oregon	19	2,645	520	98,483	1,972	18	1,022	178	36,610	753	37	3,667	698	135,093	2,725	36
37	Pennsylvania	36	5,985	1,056	145,191	4,296	214	33,216	5,319	906,455	26,145	250	39,201	6,375	1,051,646	30,441	37
38	Rhode Island	3	447	60	8,104	400	13	1,973	372	55,982	1,462	16	2,420	432	64,086	1,862	38
39	South Carolina	6	715	137	28,603	533	22	2,202	380	71,083	1,421	28	2,917	517	99,686	1,954	39
40	South Dakota	19	1,756	349	55,407	1,209	19	1,061	188	34,479	694	38	2,817	537	89,886	1,903	40
41	Tennessee	14	2,389	332	94,171	1,891	27	2,344	379	66,505	1,753	41	4,733	711	160,676	3,644	41
42	Texas	58	6,778	1,335	293,827	5,058	82	4,984	661	146,922	2,939	140	11,762	1,996	440,749	7,997	42
43	Utah	10	1,414	376	53,594	907	6	266	81	8,083	144	16	1,680	457	61,677	1,111	43
44	Vermont	2	290	49	8,964	214	19	1,912	261	37,718	1,519	21	2,202	310	46,682	1,733	44
45	Virginia	4	557	105	17,544	378	45	4,367	878	151,416	3,049	49	4,924	983	168,960	3,427	45
46	Washington	24	3,111	727	119,255	2,157	40	3,518	702	134,002	2,507	64	6,629	1,429	253,257	4,664	46
47	West Virginia	10	1,346	249	56,981	1,185	19	2,055	277	49,786	1,527	29	3,401	526	116,767	2,712	47
48	Wisconsin	66	8,623	1,549	266,169	6,440	50	2,927	611	105,601	2,136	116	11,550	2,160	371,770	8,576	48
49	Wyoming	6	130	48	5,068	66	5	173	44	5,508	81	11	303	92	10,576	147	49
	Totals (1951)	1,116	154,053	28,292	5,152,206	117,572	2,121	225,903	36,672	6,695,804	168,577	3,237	379,956	64,964	11,848,010	286,149	
	(1950)	1,097	150,078	27,736	4,944,745	114,992	2,072	218,788	36,040	6,309,157	163,093	3,169	368,866	63,776	11,253,902	278,085	
	(1949)	1,090	146,315	27,664	4,758,992	114,408	2,067	213,576	35,565	6,089,085	159,560	3,157	359,891	63,229	10,848,077	273,968	
	(1948)	1,068	144,036	27,645	4,719,967	115,225	2,016	208,936	34,990	5,933,318	159,825	3,084	352,972	62,635	10,653,285	275,050	
	(1947)	1,051	141,920	27,145	4,524,859	118,780	1,955	202,661	34,110	5,652,649	158,835	3,016	344,581	61,255	10,177,508	277,615	
	(1946)	1,050	138,090	26,256	4,098,042	115,358	1,942	198,885	33,120	5,100,117	153,580	2,992	336,981	59,376	9,198,159	268,938	
	(1945)	1,036	135,481	25,465	3,887,100	110,557	1,954	195,805	32,497	4,745,712	147,694	2,990	331,286	57,962	8,632,812	258,251	
	(1944)	1,030	133,090	24,948	3,707,991	105,940	1,961	195,624	31,854	4,596,048	144,328	2,981	328,714	56,802	8,304,039	250,268	
	(1943)	1,004	130,488	24,007	3,503,396	101,150	1,952	192,219	30,731	4,486,274	140,095	2,956	322,707	54,738	7,989,670	241,245	
	(1942)	977	126,141	22,262	3,211,162	94,521	1,949	190,150	29,154	4,252,486	141,633	2,926	316,291	51,416	7,463,648	236,154	
	(1941)	993	123,331	20,145	2,961,594	90,195	1,917	182,140	26,422	3,931,141	132,472	2,910	305,471	46,567	6,892,735	222,667	
	(1940)	998	120,809	18,561	2,679,876	85,007	1,903	177,681	24,978	3,574,974	125,757	2,901	298,490	43,539	6,254,850	210,764	
	(1939)	1,001	120,740	18,044	2,682,762	81,984	1,839	172,765	23,371	3,503,488	119,342	2,840	293,505	41,415	6,186,250	201,326	
	(1938)	981	119,521	17,320	2,531,796	80,576	1,776	169,980	22,523	3,316,310	117,558	2,757	289,501	39,843	5,848,106	198,134	
	(1937)	975	115,283	16,851	2,495,114	79,113	1,718	162,474	21,511	3,201,042	114,508	2,693	277,757	38,362	5,696,156	193,621	
	(1936)	969	113,288	16,360	2,286,064	74,037	1,742	162,586	21,238	2,972,708	107,510	2,711	275,854	37,598	5,258,772	181,547	
	(1935)	970	113,268	16,033	1,950,308	69,592	1,670	155,300	20,119	2,527,207	98,088	2,640	268,568	36,152	4,477,515	167,680	
	(1934)	970	113,263	16,067	1,786,522	68,851	1,676	154,449	20,184	2,377,213	93,216	2,646	267,712	36,251	4,163,735	157,067	
	(1933)	984	115,840	16,190	1,753,565	63,621											
	(1932)	1,001	117,555	16,125	1,918,214	70,119											
	(1931)	1,011	116,935	15,861	2,013,352	73,911											
	(1930)	1,017	116,846	15,615	.....	75,162											
	(1929)	1,024	113,555	15,037	.....	75,770											
	(1928)	1,056	114,613	13,190	.....	.....											
	(1927)	1,060	108,582	.....	.....	73,813											

Bed Capacity

Comparative Totals
1950: 1,456,912
1951: 1,529,988

The bed capacity in the hospitals registered by the American Medical Association reached its highest point in 1945, when a total of 1,738,944 beds were reported, as shown in table A. In the following three years the number declined to 1,423,520, incident mainly to changes in the federal group. A net gain of 15,510 beds occurred in 1949, with a further increase of 17,822 in 1950. Again in the last year the bed capacity increased by 73,076, and practically all divisions as shown in tables C and D shared in this advance. Included in the present total of 1,529,988 are 1,097,720 (71.7%) in governmental hospitals and 432,268 (28.3%) in the nongovernmental group. In the governmental divisions reported in table C the bed accommodations range from 12,211 in the city-county group to 683,376 in the state hospitals, where 619,151 beds are specifically allocated for psychiatric care. Table F shows a combined capacity of 216,939 beds in the federal classification. These include 116,494 in the Veterans group and 77,956 in

TABLE 1.—HOSPITAL FACILITIES BY STATES AND BY CONTROL:
C. PROPRIETARY

Marginal No.		Individual and Partnership					Corporations (Profit Unrestricted)					Total Proprietary					TOTAL NONGOVERNMENTAL: Totals of Tables 1B and 1C					Marginal No.
		Hospitals	Beds	Bassinets	Patients Admitted	Average Census	Hospitals	Beds	Bassinets	Patients Admitted	Average Census	Hospitals	Beds	Bassinets	Patients Admitted	Average Census	Hospitals	Beds	Bassinets	Patients Admitted	Average Census	
1	Alabama	36	1,139	259	44,416	656	12	793	173	27,732	483	48	1,932	432	72,148	1,139	76	5,015	921	163,931	3,302	1
2	Arizona	9	201	32	4,774	93	..	...	...	.....	...	9	201	32	4,774	93	37	2,321	385	73,349	1,499	2
3	Arkansas	23	714	183	25,764	324	2	45	17	1,904	16	25	759	200	27,668	340	48	2,935	564	106,911	1,814	3
4	California	72	2,762	345	68,298	2,008	48	2,716	344	88,800	1,949	120	5,478	689	157,098	3,957	272	23,498	3,913	848,907	18,187	4
5	Colorado	9	372	35	5,062	287	4	164	16	3,071	125	13	536	51	8,133	412	74	6,085	826	167,205	4,364	5
6	Connecticut	1	45	...	207	43	7	478	...	1,087	342	8	523	...	1,294	385	51	8,732	1,260	240,077	6,581	6
7	Delaware	..	.....	...	.....	...	1	15	6	373	8	1	15	6	373	8	9	1,294	235	38,335	857	7
8	Dist. of Columbia	1	18	8	536	10	1	237	61	10,059	210	2	255	69	10,595	220	17	3,280	621	111,985	2,521	8
9	Florida	29	823	167	23,585	460	10	509	112	16,102	254	39	1,332	279	39,687	714	92	5,832	1,125	174,003	3,569	9
10	Georgia	39	1,113	202	37,670	611	12	431	77	16,888	268	51	1,544	279	54,558	879	83	4,780	777	174,049	3,256	10
11	Idaho	9	206	46	7,531	113	1	28	10	1,841	20	10	234	56	9,372	133	34	1,660	425	59,526	981	11
12	Illinois	35	1,176	59	11,207	826	23	1,527	91	23,863	1,126	58	2,703	150	35,070	1,952	261	30,953	4,872	895,681	23,859	12
13	Indiana	11	261	40	7,673	160	5	450	20	14,660	288	16	711	60	22,333	448	69	7,842	1,477	290,952	6,104	13
14	Iowa	22	504	129	13,528	326	4	152	27	3,792	112	26	656	156	17,320	438	97	7,746	1,449	249,376	5,816	14
15	Kansas	14	286	75	6,912	149	..	...	...	.....	...	14	286	75	6,912	149	83	5,781	1,097	179,757	4,161	15
16	Kentucky	14	402	95	13,341	189	9	459	67	19,010	316	23	861	162	32,351	505	80	5,993	1,015	201,971	4,131	16
17	Louisiana	47	1,138	293	47,141	604	12	489	72	18,142	283	59	1,627	365	65,283	887	95	5,692	989	217,753	3,645	17
18	Maine	4	96	32	2,366	61	3	91	14	2,261	66	7	187	46	4,627	127	42	2,734	540	83,117	1,942	18
19	Maryland	6	235	8	1,614	174	4	262	12	2,692	204	10	497	20	4,306	378	53	7,401	870	169,859	5,683	19
20	Massachusetts	5	145	20	2,785	90	16	765	100	16,085	546	21	910	120	18,870	636	149	16,527	2,960	449,343	12,186	20
21	Michigan	20	559	60	9,421	405	7	380	...	3,310	309	27	939	60	12,731	714	160	16,558	3,111	561,464	13,065	21
22	Minnesota	17	293	88	6,679	161	10	824	16	24,192	641	27	1,117	104	30,871	802	140	10,998	1,828	354,742	8,350	22
23	Mississippi	19	543	101	16,514	249	4	171	27	6,784	94	23	714	128	23,298	343	61	2,931	555	122,176	1,892	23
24	Missouri	22	624	167	18,848	410	11	449	133	8,006	272	32	1,023	275	26,718	651	116	12,086	2,027	334,262	9,576	24
25	Montana	4	107	23	3,018	63	2	48	7	2,048	22	6	155	30	5,066	85	44	2,939	589	92,247	2,188	25
26	Nebraska	27	560	176	15,850	280	5	228	36	3,572	159	32	788	212	19,422	439	88	5,009	1,032	150,098	3,279	26
27	Nevada	1	45	12	2,033	28	..	...	...	.....	...	1	45	12	2,033	28	5	255	55	9,367	153	27
28	New Hampshire	..	.....	...	.....	...	1	45	...	75	43	1	45	...	75	43	29	2,142	434	63,045	1,400	28
29	New Jersey	6	412	11	1,407	338	6	327	...	961	263	13	789	36	2,504	632	111	15,070	2,498	412,771	11,272	29
30	New Mexico	1	20	...	47	5	..	...	...	.....	...	1	20	...	47	5	24	1,342	267	41,886	836	30
31	New York	38	1,765	253	33,677	1,162	32	3,659	599	111,154	2,724	69	5,381	852	143,141	3,858	361	54,034	7,517	1,353,578	41,916	31
32	North Carolina	21	575	128	20,569	320	4	316	24	5,455	199	25	891	152	26,024	519	124	9,540	1,892	362,390	6,598	32
33	North Dakota	..	.....	...	.....	...	..	...	...	.....	...	..	...	...	.....	...	36	2,576	520	84,461	1,656	33
34	Ohio	9	281	14	2,869	220	10	706	18	6,540	589	19	987	32	9,409	809	164	21,406	3,649	733,503	17,308	34
35	Oklahoma	34	1,070	247	40,803	661	5	255	29	6,840	176	39	1,325	276	47,643	837	72	4,272	862	147,866	2,899	35
36	Oregon	10	297	68	11,871	166	12	832	117	16,543	645	22	1,129	185	28,414	811	59	4,796	883	163,507	3,536	36
37	Pennsylvania	17	584	58	7,541	401	8	394	18	3,125	335	25	978	76	10,666	736	275	40,179	6,451	1,062,312	31,177	37
38	Rhode Island	..	.....	...	.....	...	..	...	...	.....	...	..	...	...	.....	...	16	2,420	432	64,086	1,862	38
39	South Carolina	7	180	31	6,205	76	3	158	25	3,714	81	10	338	56	9,919	157	38	3,255	573	109,605	2,111	39
40	South Dakota	3	47	17	1,443	29	..	...	...	.....	...	3	47	17	1,443	29	41	2,864	554	91,329	1,932	40
41	Tennessee	39	956	211	34,037	528	15	557	106	22,480	371	54	1,513	317	56,517	899	95	6,246	1,028	217,193	4,543	41
42	Texas	217	4,759	1,142	186,191	2,494	38	1,635	330	63,991	1,071	256	6,437	1,472	251,872	3,593	395	18,156	3,468	690,931	11,562	42
43	Utah	6	138	57	5,011	72	..	...	...	.....	...	6	138	57	5,011	72	22	1,818	514	66,688	1,183	43
44	Vermont	2	42	17	1,004	20	..	...	...	.....	...	2	42	17	1,004	20	23	2,244	327	47,686	1,753	44
45	Virginia	15	526	113	18,792	305	22	1,895	305	68,237	1,468	37	2,421	418	87,029	1,773	86	7,345	1,401	255,989	5,200	45
46	Washington	18	614	114	21,719	399	5	212	34	3,414	125	23	826	148	25,133	524	87	7,455	1,577	278,390	5,188	46
47	West Virginia	8	523	72	21,365	394	20	1,595	271	69,817	1,273	28	2,118	343	91,182	1,667	57	5,519	869	207,949	4,379	47
48	Wisconsin	13	253	71	6,084	154	8	488	26	3,580	392	21	741	97	9,664	546	137	12,291	2,257	381,434	9,122	48
49	Wyoming	6	118	31	3,085	40	..	...	...	.....	...	6	118	31	3,085	40	17	421	123	13,661	187	49
	Totals (1951)	966	27,527	5,310	820,493	16,564	402	24,785	3,340	702,200	17,868	1,368	52,312	8,650	1,522,693	34,432	4,605	432,268	73,614	13,370,703	320,581	
	(1950)	958	26,561	5,321	774,937	15,944	391	24,444	3,490	677,304	17,287	1,349	51,005	8,811	1,452,241	33,231	4,518	419,871	72,587	12,706,143	311,316	
	(1949)	1,077	29,669	6,099	870,668	17,947	401	24,315	3,673	682,443	17,193	1,478	53,984	9,772	1,553,111	35,140	4,635	413,875	73,001	12,401,188	309,108	
	(1948)	973	27,567	5,668	814,776	17,457	378	23,214	3,536	664,222	17,078	1,351	50,781	9,204	1,478,998	34,535	4,435	403,753	71,839	12,132,283	309,585	
	(1947)	984	28,325	6,137	848,082	18,303	359	22,111	3,262	599,580	16,708	1,343	50,436	9,399	1,447,662	35,011	4,359	395,017	70,654	11,625,170	312,626	
	(1946)	980	28,116	6,114	817,301	17,114	346	20,883	2,927	539,829	15,470	1,326	48,999	9,041	1,357,130	32,584	4,318	385,980	68,417	10,555,289	301,522	
	(1945)	987	30,216	5,597	715,908	17,442	351	20,724	2,986	509,569	15,140	1,338	50,940	8,583	1,225,477	32,582	4,328	382,226	66,545	9,858,289	290,833	
	(1944)	1,011	27,301	5,648	678,965	16,972	357	21,652	3,052	508,624	16,051	1,368	48,953	8,700	1,187,589	33,023	4,349	377,667	65,502	9,491,628	283,291	
	(1943)	1,031	27,314	5,370	638,999	16,282	384	23,094	3,187	513,202	15,865	1,415	50,408	8,557	1,152,201	32,147	4,371	373,115	63,295	9,111,871	273,392	
	(1942)	1,089	27,996	5,147	576,466	15,715	406	23,759	3,057	495,821	15,521	1,495	51,755	8,204	1,072,287	31,236	4,421	368,046	59,620	8,535,935	267,390	
	(1941)	1,149	28,760	5,054	545,884	16,582	435	24,639	3,048	494,967	15,898	1,584	53,399	8,102	1,040,851	32,480	4,494	358,870	54,669	7,933,586	255,147	
	(1940)	1,174	28,958	4,820	500,040	15,049	449	25,108	3,021	463,654	15,686	1,623	54,066	7,841	963,694	30,735	4,524	352,556	51,380	7,218,544	241,499	
	(1939)	1,190	29,879	4,756	501,860	14,955	456	26,496	2,989	456,759	16,154	1,646	56,375	7,745	958,619	31,109	4,486	349,880	49,160	7,144,869	232,435	
	(1938)	1,188	30,193	4,557	495,553	15,255	493	26,550	3,236	470,136	15,630	1,681	56,743	7,793	965,689	30,885	4,438	346,244	47,636	6,813,795	229,019	
	(1937)	1,183	29,957	4,766	508,359	15,458	530	28,085	3,516	507,077	16,477	1,713	58,042	8,282	1,015,436	31,935	4,406	335,799	46,644	6,711,592	225,556	
	(1936)	1,204	28,496	4,356	437,797	13,672	550	28,511	3,629	497,457	16,462	1,754	57,007	7,985	935,254	30,134	4,465	332,881	45,583	6,194,026	211,681	
	(1935)	1,255	29,913	4,384	413,997	14,212	627	34,946	4,357	532,590	18,697	1,882	64,859	8,741	946,587	32,909	4,522	333,427	44,893	5,424,102	200,589	
	(1934)	1,310	29,429	4,391	366,313	12,046	629	33,072	4,038	458,303	15,985	1,939	62,501	8,429	824,616	28,031	4,585	330,213	44,680	4,988,351	185,098	
	(1933)	1,435	33,385	4,962	381,861	13,746											4,661	332,573	44,649	4,882,444	184,197	
	(1932)	1,522	25,759	5,094	428,256	16,309											4,758	334,987	44,572	5,178,598	198,277	
	(1931)	1,560	36,764	5,352	459,184	17,912											4,797	332,591	44,232	5,322,898	206,095	
	(1930)	1,620	38,557	5,233	.....	19,948											4,907	336,143	43,281	.....	212,645	
	(1929)	1,611	37,977	5,212	.....	20,604											4,870	324,596	41,877	.....	209,881	
	(1928)	1,699	39,710	4,843	.....	.....											5,039	325,500	37,641	.....	.....	
	(1927)	1,682	39,118	.....	.....	21,779											4,998	808,149	.....	.....	201,675	

TABLE 2.—HOSPITAL FACILITIES BY STATES AND BY TYPE OF SERVICE (Continued on next page)

Marginal No.		General					Nervous and Mental					Tuberculosis					Maternity					Industrial					Eye, Ear, Nose and Throat					Marginal No.
		Hospitals	Beds	Bassinets	Patients Admitted	Average Census	Hospitals	Beds	Bassinets	Patients Admitted	Average Census	Hospitals	Beds	Bassinets	Patients Admitted	Average Census	Hospitals	Beds	Bassinets	Patients Admitted	Average Census	Hospitals	Beds	Bassinets	Patients Admitted	Average Census	Hospitals	Beds	Bassinets	Patients Admitted	Average Census	
1	Alabama	88	8,100	1,324	259,517	5,311	7	11,284	6	8,331	10,866	7	673	1	1,188	642	1	45	20	143	32	..	...	..	.....	...	..	...	..	.....	...	1
2	Arizona	53	3,903	591	105,771	2,721	2	1,678	..	954	1,568	11	1,422	..	5,268	1,138	..	...	...	.....	...	..	...	..	.....	...	..	...	..	.....	...	2
3	Arkansas	65	5,359	812	150,223	3,380	2	6,879	..	3,921	6,657	2	1,558	..	2,096	1,545	..	...	...	.....	...	2	275	..	6,136	138	..	...	..	.....	...	3
4	California	271	55,091	5,049	1,246,705	41,735	44	48,821	..	29,699	45,898	26	5,877	..	6,215	4,989	10	336	242	8,016	222	2	646	..	12,234	525	2	55	..	3,497	27	4
5	Colorado	76	10,597	991	201,336	7,551	9	7,773	..	5,181	7,326	8	903	..	735	681	2	89	21	387	17	1	8	..	324	2	..	...	..	.....	...	5
6	Connecticut	37	7,542	1,262	242,688	5,708	15	12,973	6	5,415	12,307	6	1,527	..	1,808	1,390	..	...	...	.....	...	..	...	..	.....	...	..	...	..	.....	...	6
7	Delaware	9	1,509	235	40,196	1,031	3	2,230	..	1,090	2,205	2	182	..	159	167	..	...	...	.....	...	..	...	..	.....	...	..	...	..	.....	...	7
8	District of Columbia	16	6,671	727	140,903	6,031	2	7,515	3	1,484	7,427	1	617	..	490	567	2	149	121	6,946	110	..	...	..	.....	...	1	100	..	6,135	60	8
9	Florida	114	11,769	1,707	306,597	7,742	8	8,153	5	4,951	7,455	5	1,670	..	1,535	1,225	3	72	64	2,285	55	..	...	..	.....	...	1	10	..	611	5	9
10	Georgia	107	10,348	1,481	333,820	6,708	7	12,878	7	7,519	12,377	1	2,000	..	1,187	1,520	1	12	12	241	3	2	140	..	4,065	89	1	25	..	2,565	20	10
11	Idaho	45	2,297	530	74,364	1,305	3	1,978	..	791	1,851	1	70	..	55	69	1	10	12	82	2	..	...	..	.....	...	..	...	..	.....	...	11
12	Illinois	227	37,989	5,259	1,048,112	29,238	31	54,583	14	20,914	50,699	28	3,856	1	4,197	3,364	5	598	184	6,954	329	2	113	..	2,999	70	3	191	..	4,528	107	12
13	Indiana	102	13,228	2,160	403,931	10,330	14	14,774	..	4,494	14,986	10	1,482	..	1,449	1,324	..	...	...	.....	...	1	50	..	670	30	1	12	..	1,729	5	13
14	Iowa	107	9,091	1,628	295,089	6,789	12	12,402	5	4,864	11,404	5	733	..	580	630	2	86	38	228	53	..	...	..	.....	...	..	...	..	.....	...	14
15	Kansas	113	9,277	1,462	243,609	6,803	7	8,747	..	5,014	8,135	3	465	..	556	409	2	80	39	186	34	2	202	..	3,653	174	..	...	..	.....	...	15
16	Kentucky	86	10,435	1,301	275,239	7,209	11	10,963	1	8,870	10,480	9	1,508	..	1,988	1,230	1	27	26	1,353	16	1	90	..	3,199	52	..	...	..	.....	...	16
17	Louisiana	101	12,279	1,486	348,440	8,513	6	9,061	1	3,523	8,322	4	384	..	603	301	1	74	6	117	25	1	60	..	767	32	1	97	..	5,482	60	17
18	Maine	43	2,972	579	87,975	2,147	5	5,259	2	3,573	4,886	4	470	..	498	392	..	...	...	.....	...	..	...	..	.....	...	..	...	..	.....	...	18
19	Maryland	48	12,299	1,288	244,694	8,631	15	11,559	..	7,659	12,079	6	1,246	..	1,025	1,104	..	...	...	.....	...	2	107	..	5,275	58	19
20	Massachusetts	141	25,961	3,235	545,104	19,131	32	33,580	10	12,943	33,524	23	4,363	4	5,069	3,323	4	383	343	12,184	275	..	...	..	.....	...	2	206	..	6,054	106	20
21	Michigan	178	25,070	3,778	735,557	19,887	23	32,300	3	12,638	30,675	23	4,911	80	10,681	4,294	2	80	80	2,068	47	2	59	..	1,549	28	1	15	..	336	1	21
22	Minnesota	164	14,178	2,260	413,055	10,496	17	14,061	20	7,762	13,082	12	1,740	..	1,529	1,423	3	99	80	2,855	38	..	...	..	.....	...	1	185	..	6,999	141	22
23	Mississippi	85	5,656	842	177,163	3,358	6	6,662	..	4,297	6,261	1	457	1	449	411	..	...	...	.....	...	..	...	..	.....	...	..	...	..	.....	...	23
24	Missouri	112	14,768	2,196	393,056	11,446	15	15,654	2	4,380	15,296	7	2,622	1	3,899	2,163	7	353	305	6,160	227	3	444	..	10,459	313	1	65	..	520	45	24
25	Montana	52	3,605	618	95,708	2,475	1	1,957	..	786	1,930	1	225	..	215	196	..	...	...	.....	...	1	85	..	2,114	57	1	16	..	1,007	3	25
26	Nebraska	98	6,491	1,119	174,942	4,133	5	6,736	2	1,987	6,463	1	225	..	142	175	2	49	29	222	31	..	...	..	.....	...	..	...	..	.....	...	26
27	Nevada	15	1,008	154	25,484	665	1	400	..	167	374	..	...	..	...	...	..	...	...	.....	...	..	...	..	.....	...	..	...	..	.....	...	27
28	New Hampshire	33	2,652	495	71,123	1,732	2	3,426	..	1,034	3,285	2	133	..	160	122	..	...	...	.....	...	..	...	..	.....	...	..	...	..	.....	...	28
29	New Jersey	86	16,868	2,617	468,644	12,537	22	26,498	2	8,124	25,578	14	3,618	2	4,332	3,012	2	386	391	10,352	199	..	...	..	.....	...	1	65	..	3,164	40	29
30	New Mexico	36	2,194	435	64,587	1,381	4	1,305	..	644	1,232	5	807	1	1,248	652	..	...	...	.....	...	1	76	..	1,339	60	..	...	..	.....	...	30
31	New York	314	73,849	8,381	1,701,518	56,443	58	120,421	59	36,680	114,187	49	11,323	..	12,550	10,076	9	601	335	21,986	495	2	46	1	726	21	7	671	..	34,294	389	31
32	North Carolina	134	13,772	2,369	450,223	9,281	10	11,245	2	4,889	10,416	19	3,957	..	6,621	2,980	2	20	16	750	6	1	50	..	658	20	2	81	..	4,829	49	32
33	North Dakota	42	3,023	549	91,538	1,901	2	3,272	2	692	3,262	1	348	..	264	305	1	45	6	76	10	..	...	..	.....	...	..	...	..	.....	...	33
34	Ohio	153	26,206	4,131	826,541	20,712	28	36,055	1	14,363	34,370	24	4,443	..	3,688	3,739	9	180	178	7,209	113	1	18	..	173	4	..	...	..	.....	...	34
35	Oklahoma	101	7,406	1,288	214,722	4,934	7	10,180	..	3,536	9,426	4	679	..	1,015	597	1	25	15	65	18	..	...	..	.....	...	..	...	..	.....	...	35
36	Oregon	61	5,531	980	183,787	4,013	6	5,509	1	2,541	5,332	4	480	..	706	425	1	14	12	148	7	..	...	..	.....	...	..	...	..	.....	...	36
37	Pennsylvania	230	45,034	6,666	1,117,912	35,217	39	51,944	..	14,635	49,207	16	4,906	..	4,598	3,844	7	404	113	2,137	289	..	...	..	.....	...	5	348	..	11,775	239	37
38	Rhode Island	15	4,097	323	67,756	3,067	4	4,473	4	1,732	4,273	2	637	..	321	464	1	175	175	8,146	149	..	...	..	.....	...	..	...	..	.....	...	38
39	South Carolina	55	7,821	1,017	213,294	5,362	3	6,701	2	2,279	6,663	5	848	..	779	658	..	...	...	.....	...	..	...	..	.....	...	1	15	..	439	4	39
40	South Dakota	53	3,480	642	101,117	2,327	3	3,408	..	856	3,148	2	319	..	412	223	..	...	...	.....	...	..	...	..	.....	...	..	...	..	.....	...	40
41	Tennessee	97	10,997	1,451	308,739	8,328	12	10,238	8	6,301	9,818	8	1,839	9	2,815	1,469	1	60	...	1,975	54	..	...	..	.....	...	7	149	..	7,885	72	41
42	Texas	449	33,234	4,703	969,153	22,693	17	18,546	..	10,175	20,507	19	4,182	..	5,100	3,245	4	71	27	1,048	43	5	438	..	9,345	256	9	104	..	4,956	33	42
43	Utah	28	2,335	590	78,159	1,526	2	2,052	..	494	1,984	1	100	..	136	79	1	23	25	996	11	..	...	..	.....	...	..	...	..	.....	...	43
44	Vermont	23	1,744	327	50,477	1,237	3	2,287	..	930	2,440	2	118	..	161	115	..	...	...	.....	...	..	...	..	.....	...	..	...	..	.....	...	44
45	Virginia	92	15,729	1,832	379,629	10,964	11	14,535	12	8,766	14,324	7	1,360	..	1,261	1,217	..	...	...	.....	...	1	16	..	76	4	3	78	..	2,436	38	45
46	Washington	104	12,699	1,843	353,611	8,766	8	10,342	..	4,136	9,604	12	3,039	..	4,307	2,588	1	10	16	113	3	1	21	1	465	15	..	...	..	.....	...	46
47	West Virginia	63	7,320	965	234,484	5,740	7	5,482	2	2,293	5,135	5	1,150	..	1,000	1,029	..	...	...	.....	...	..	...	..	.....	...	..	...	..	.....	...	47
48	Wisconsin	140	14,894	2,545	455,546	10,992	42	17,590	10	7,971	17,040	21	2,857	..	2,054	2,049	1	76	15	235	40	..	...	..	.....	...	..	...	..	.....	...	48
49	Wyoming	28	1,769	282	53,983	1,065	3	1,818	..	732	7,757	1	50	..	46	28	..	...	...	.....	...	..	...	..	.....	...	..	...	..	.....	...	49
	Totals (1951)	4,890	640,207	88,505	17,065,821	470,692	596	728,187	192	307,010	697,521	430	88,379	100	107,181	73,588	90	4,632	2,946	105,663	2,953	32	2,837	2	60,951	1,890	53	2,595	..	114,516	1,502	
	(1950)	4,713	587,917	85,582	15,830,170	433,364	579	711,921	221	307,165	687,567	431	85,746	89	113,275	72,370	92	4,699	2,994	102,147	3,060	27	2,661	31	58,180	1,807	51	2,560	3	113,951	1,483	
	(1949)	4,761	574,683	85,502	15,450,311	429,443	606	705,423	226	308,055	675,096	444	83,470	110	113,078	69,476	102	5,087	3,153	98,543	3,359	33	2,945	1	60,159	1,925	52	2,542	14	118,665	1,538	
	(1948)	4,589	576,459	83,497	15,160,062	437,590	586	691,499	279	305,000	664,399	438	81,993	21	105,588	66,484	100	5,226	3,319	98,114	3,398	33	2,940	1	61,817	2,054	46	2,531	13	118,355	1,524	
	(1947)	4,539	592,453	82,303	14,665,195	456,761	585	680,913	259	291,954	651,578	441	81,328	32	99,080	62,575	100	5,442	3,312	100,382	3,929	33	2,914	..	57,110	1,869	44	2,534	13	116,563	1,553	
	(1946)	4,523	641,331	79,534	14,051,508	496,527	575	674,930	322	271,209	635,769	450	83,187	36	99,741	61,931	101	5,392	3,426	82,191	3,777	34	2,980	..	56,061	1,838	46	2,749	16	111,417	1,710	
	(1945)	4,744	922,549	78,919	15,228,270	665,105	563	657,393	295	248,876	624,349	449	78,774	54	86,186	59,767	106	5,656	3,544	77,078	3,741	36	2,963	..	58,394	1,847	42	2,664	8	108,531	1,615	
	(1944)	4,833	925,818	76,570	15,060,403	570,331	566	648,745	206	226,393	618,951	453	79,848	38	88,281	63,025	107	5,762	3,708	81,964	3,805	39	2,893	6	55,974	1,789	42	2,695	6	102,898	1,489	
	(1943)	4,885	850,576	72,839	14,454,638	529,340	575	650,998	210	208,677	619,447	455	79,860	112	91,674	65,302	112	6,085	3,800	84,974	3,908	41	3,226	2	61,249	1,920	40	2,421	6	99,948	1,322	
	(1942)	4,557	594,260	67,115	11,634,288	405,382	586	646,118	216	214,117	609,773	468	82,372	116	101,526	70,005	113	5,903	3,777	80,375	4,171	36	2,896	2	46,723	1,608	42	2,546	10	100,544	1,397	
	(1941)	4,518	533,498	61,732	10,646,947	363,614	596	638,144	219	208,592	603,179	477	82,365	99	101,473	70,577	116	5,318	3,573	64,874	3,472	39	2,960	14	49,201	1,662	41	2,502	4	97,043	1,388	
	(1940)	4,432	462,360	58,073	9,219,496	325,160	602	621,284	161	190,376	590,712	479	78,246	44	90,936	67,007	116	5,647	3,380	60,518	3,534	33	2,792	3	41,835	1,504	41	2,470	4	97,853	1,343	
	(1939)	4,356	444,947	55,183	9,018,316	307,991	600	606,284	110	190,249	577,103	480	75,972	38	90,615	65,487	118	5,553	3,196	59,381	3,552	40	3,215	5	45,085	1,622	41	2,467	..	99,291	1,329	
	(1938)	4,286	425,324	52,924	8,545,930	292,870	592	591,822	187	198,708	562,337	493	76,022	41	100,801	66,242	120	5,969	3,361	66,145	3,699	37	2,992	2	42,666	1,482	38	1,992	..	90,863	1,080	
	(1937)	4,245	412,091	51,668	8,349,773	288,280	579	570,616	124	195,624	546,906	508	76,751	33	101,839	64,800	114	5,466	3,487	59,949	3,480	36	2,835	..	41,028	1,549	39	1,946	3	95,241	1,115	
	(1936)	4,207	402,605	49,604	7,755,848	271,658	584	548,952	109	184,936	524,993	506	73,692	36	99,234	63,266	125	6,402	3,846	67,925	4,065	44	3,159	10	41,862	1,536	43	2,118	32	99,273	1,113	
	(1935)	4,257	406,174	48,757	6,875,182	261,294	592	529,311	132	173,009	507,269	496	70,373	58	86,113	60,738	121	6,141	3,825	66,693	3,582	52	3,421	11	41,432	1,576	44	2,263	11	97,181	1,089	
	(1934)	4,198	393,425	47,856	6,291,556	237,396	614	513,845	84	172,415	488,481	495	70,063	..	82,455	59,089	130	7,625	4,131	76,980	4,647	113	5,575	343	69,609	2,423	55	2,793	19	103,720	1,265	

TABLE 2.—HOSPITAL FACILITIES BY STATES AND BY TYPE OF SERVICE—(Continued)

Marginal No.		Children's					Orthopedic					Isolation					Convalescent and Rest					Hospital Departments of Institutions					All Other Hospitals					Totals					Marginal No.
		Hospitals	Beds	Bassinets	Patients Admitted	Average Census	Hospitals	Beds	Bassinets	Patients Admitted	Average Census	Hospitals	Beds	Bassinets	Patients Admitted	Average Census	Hospitals	Beds	Bassinets	Patients Admitted	Average Census	Hospitals	Beds	Bassinets	Patients Admitted	Average Census	Hospitals	Beds	Bassinets	Patients Admitted	Average Census	Hospitals	Beds	Bassinets	Patients Admitted	Average Census	
1	Alabama	1	65	..	1,843	51	1	100	..	330	40	..	.....	..	.....	...	1	16	..	284	8	5	167	1	3,282	39	..	.....	..	.....	.....	111	20,450	1,352	274,918	16,989	1
2	Arizona	..	...	..	.....	...	1	50	..	395	50	..	.....	..	.....	...	2	69	..	542	26	..	.....	..	.....	.....	..	.....	..	.....	.....	69	7,182	591	112,930	5,503	2
3	Arkansas	1	70	5	846	60	..	...	..	.....	...	1	900	7	10,764	197	..	.....	..	.....	...	..	.....	..	.....	.....	..	.....	..	.....	.....	73	15,041	824	173,986	11,977	3
4	California	4	455	1	15,043	330	3	178	..	2,723	152	1	16	..	156	4	13	513	..	2,372	393	8	956	1	9,603	619	1	100	..	51	99	385	113,044	5,293	1,336,314	94,993	4
5	Colorado	1	195	15	12,889	172	..	...	..	.....	...	..	.....	..	.....	...	..	.....	..	.....	...	5	147	..	1,705	86	1	33	..	150	25	103	19,745	1,027	222,657	15,810	5
6	Connecticut	...	...	..	.....	...	1	197	..	293	160	1	150	..	189	21	2	155	..	845	99	8	1,140	11	5,747	459	1	72	2	88	51	71	23,756	1,281	257,073	20,195	6
7	Delaware	..	...	..	.....	...	1	85	..	247	50	..	.....	..	.....	...	..	.....	..	.....	...	1	378	7	286	399	..	.....	..	.....	.....	16	4,384	242	41,978	3,852	7
8	District of Columbia	1	227	..	9,231	136	..	...	..	.....	...	..	.....	..	.....	...	1	30	10	120	30	3	1,008	..	2,037	777	1	180	..	49	180	28	16,497	861	167,395	15,318	8
9	Florida	2	159	..	2,409	98	2	200	..	532	120	1	300	3	5,012	156	2	115	..	647	53	2	90	..	1,704	12	1	62	..	63	36	141	22,600	1,779	326,346	16,957	9
10	Georgia	1	40	4	1,381	31	3	285	..	1,535	266	1	884	5	21,527	413	1	34	..	63	25	3	189	..	2,787	70	1	80	..	284	63	129	26,915	1,509	376,974	21,585	10
11	Idaho	..	...	..	.....	...	1	56	..	181	50	..	.....	..	.....	...	..	.....	..	.....	...	1	40	..	861	9	..	.....	..	.....	.....	52	4,451	542	76,334	3,286	11
12	Illinois	3	350	..	7,688	205	4	182	..	331	129	2	330	..	2,642	82	23	1,280	..	4,617	934	8	508	..	11,113	158	5	2,664	..	1,509	2,543	341	102,644	5,458	1,115,604	87,858	12
13	Indiana	1	100	6	524	27	..	...	..	.....	...	..	.....	..	.....	...	2	268	..	7,678	165	5	517	..	3,753	215	1	23	..	348	18	137	30,454	2,166	424,576	27,100	13
14	Iowa	..	...	..	.....	...	..	...	..	.....	...	1	30	1	251	5	1	18	..	38	14	3	260	..	1,866	154	..	.....	..	.....	.....	131	22,620	1,672	302,416	19,049	14
15	Kansas	..	...	..	.....	...	..	...	..	.....	...	1	120	..	3,836	91	..	.....	..	.....	...	6	381	1	4,343	118	1	25	..	180	10	134	19,177	1,502	257,541	15,683	15
16	Kentucky	1	75	..	1,549	42	2	125	..	1,433	117	..	.....	..	.....	...	1	50	..	129	33	2	86	..	598	36	1	100	..	23	98	116	23,579	1,328	298,227	19,404	16
17	Louisiana	..	...	..	.....	...	1	60	..	162	57	..	.....	..	.....	...	1	29	..	74	11	..	.....	..	.....	.....	2	550	..	1,561	407	118	22,594	1,493	360,729	17,728	17
18	Maine	..	...	..	.....	...	..	...	..	.....	...	..	.....	..	.....	...	1	17	..	4	15	..	.....	..	.....	.....	..	.....	..	.....	.....	53	8,718	581	92,050	7,440	18
19	Maryland	..	...	..	.....	...	2	205	..	777	160	..	.....	..	.....	...	2	110	..	291	84	3	226	..	908	193	4	765	..	371	516	82	26,517	1,288	261,090	22,825	19
20	Massachusetts	3	575	28	11,769	353	4	375	..	352	241	2	52	..	137	4	1	25	..	33	12	4	245	..	1,855	181	4	463	..	1,507	431	220	66,228	3,620	597,027	57,581	20
21	Michigan	1	200	..	5,291	129	2	146	..	721	124	2	130	..	912	57	10	547	..	1,762	378	10	1,084	5	9,665	827	2	108	..	2,083	66	256	64,650	3,946	783,263	56,513	21
22	Minnesota	1	75	..	3,102	66	3	334	..	890	303	..	.....	..	.....	...	4	347	..	1,230	296	6	228	..	2,844	111	1	69	..	58	68	212	31,316	2,360	439,884	26,024	22
23	Mississippi	..	...	..	.....	...	..	...	..	.....	...	2	775	10	20,482	404	..	.....	..	.....	...	..	.....	..	.....	.....	..	.....	..	.....	.....	94	13,550	853	202,391	10,434	23
24	Missouri	2	281	..	5,515	225	2	162	..	302	144	1	100	6	2,009	41	1	31	..	182	22	7	1,728	..	4,472	1,150	5	1,740	..	2,970	1,637	163	37,948	2,510	433,975	32,709	24
25	Montana	..	...	..	.....	...	1	26	25	363	25	..	.....	..	.....	...	..	.....	..	.....	...	..	.....	..	.....	.....	..	.....	..	.....	.....	57	5,914	643	100,193	4,686	25
26	Nebraska	1	96	..	3,315	72	2	140	..	900	91	..	.....	..	.....	...	1	55	..	35	54	2	52	..	1,294	24	..	.....	..	.....	.....	112	13,844	1,150	182,837	11,043	26
27	Nevada	..	...	..	.....	...	..	...	..	.....	...	..	.....	..	.....	...	..	.....	..	.....	...	..	.....	..	.....	.....	..	.....	..	.....	.....	16	1,408	154	25,651	1,030	27
28	New Hampshire	..	...	..	.....	...	..	...	..	.....	...	1	25	..	109	5	..	.....	..	.....	...	2	86	..	1,866	33	..	.....	..	.....	.....	40	6,322	495	74,292	5,177	28
29	New Jersey	1	87	3	3,063	38	8	451	..	3,237	311	4	2,504	..	2,309	2,058	9	593	..	1,714	477	9	418	3	3,734	280	2	485	..	160	371	158	51,923	3,018	508,923	44,901	29
30	New Mexico	..	...	..	.....	...	1	100	..	455	63	..	.....	..	.....	...	..	.....	..	.....	...	..	.....	..	.....	.....	..	.....	..	.....	.....	47	4,482	436	68,273	3,388	30
31	New York	4	433	20	2,699	340	11	1,131	..	5,369	948	5	995	..	9,976	684	12	1,429	..	7,740	907	24	5,434	40	22,080	4,521	16	4,498	..	12,326	4,607	511	220,831	8,836	1,868,844	193,618	31
32	North Carolina	1	50	..	1,699	24	2	280	..	694	215	1	150	..	3,080	70	1	25	..	100	15	2	209	..	2,233	80	1	40	..	63	32	176	29,879	2,387	475,839	23,194	32
33	North Dakota	..	...	..	.....	...	..	...	..	.....	...	..	.....	..	.....	...	..	.....	..	.....	...	1	30	..	398	27	1	30	..	398	27	47	6,718	557	92,968	5,505	33
34	Ohio	3	546	..	19,622	286	3	180	..	636	111	..	.....	..	.....	...	9	407	1	3,698	209	9	569	..	6,749	195	4	1,081	..	672	995	243	69,685	4,311	883,321	60,824	34
35	Oklahoma	..	...	..	.....	...	2	118	..	2,241	105	..	.....	..	.....	...	..	.....	..	.....	...	4	183	..	3,124	38	..	.....	..	.....	.....	119	18,591	1,303	224,703	15,118	35
36	Oregon	..	...	..	.....	...	1	60	..	377	60	2	135	5	606	61	..	.....	..	.....	...	1	30	..	790	9	..	.....	..	.....	.....	76	11,759	998	188,955	9,907	36
37	Pennsylvania	5	583	..	13,896	410	5	566	..	796	450	4	895	12	2,883	362	9	510	..	2,460	435	13	1,061	..	6,518	798	10	853	..	3,935	671	343	107,104	6,791	1,181,545	91,922	37
38	Rhode Island	..	...	..	.....	...	..	...	..	.....	...	1	255	..	3,035	117	..	.....	..	.....	...	..	.....	..	.....	.....	1	72	..	18	72	24	9,709	502	81,008	8,142	38
39	South Carolina	..	...	..	.....	...	1	60	..	304	54	..	.....	..	.....	...	..	.....	..	.....	...	..	.....	..	.....	.....	..	.....	..	.....	.....	65	15,445	1,019	217,095	12,741	39
40	South Dakota	..	...	..	.....	...	..	...	..	.....	...	..	.....	..	.....	...	..	.....	..	.....	...	1	36	..	269	20	..	.....	..	.....	.....	59	7,243	642	102,654	5,718	40
41	Tennessee	1	75	25	2,921	75	3	155	..	697	125	..	.....	..	.....	...	1	135	..	616	61	4	796	..	2,621	593	1	30	..	85	17	135	24,474	1,493	334,655	20,612	41
42	Texas	3	213	4	3,682	115	2	100	..	661	82	2	465	10	8,120	202	6	183	..	596	130	7	500	..	5,576	178	4	312	..	2,557	208	527	58,348	4,744	1,020,969	47,692	42
43	Utah	1	33	..	135	32	1	58	..	59	29	..	.....	..	.....	...	..	.....	..	.....	...	..	.....	..	.....	.....	..	.....	..	.....	.....	34	4,601	615	79,979	3,661	43
44	Vermont	..	...	..	.....	...	..	...	..	.....	...	..	.....	..	.....	...	..	.....	..	.....	...	1	12	..	130	4	..	.....	..	.....	.....	29	4,161	327	51,698	3,796	44
45	Virginia	..	...	..	.....	...	2	137	..	742	96	..	.....	..	.....	...	..	.....	..	.....	...	4	233	..	3,550	60	..	.....	..	.....	.....	120	32,088	1,844	396,460	26,703	45
46	Washington	..	...	..	.....	...	2	185	..	3,175	150	..	.....	..	.....	...	..	.....	..	.....	...	3	228	..	2,297	90	2	270	..	2,621	252	133	26,794	1,860	370,725	21,468	46
47	West Virginia	..	...	..	.....	...	2	221	..	1,039	131	1	50	4	1,376	34	..	.....	..	.....	...	2	82	6	1,075	45	..	.....	..	.....	.....	80	14,305	977	241,267	12,114	47
48	Wisconsin	1	150	..	4,921	121	..	...	..	.....	...	3	255	..	1,505	29	3	124	..	207	102	5	598	..	1,089	561	3	119	4	297	87	219	36,663	2,574	473,825	31,021	48
49	Wyoming	..	...	..	.....	...	..	...	..	.....	...	..	.....	..	.....	...	..	.....	..	.....	...	..	.....	..	.....	.....	..	.....	..	.....	.....	32	3,637	282	54,761	2,850	49
	Totals (1951)	44	5,133	111	135,043	3,438	82	6,708	25	33,009	5,209	40	9,516	63	101,026	5,097	120	7,115	11	38,057	5,078	183	19,905	75	134,414	13,098	77	14,774	6	34,427	13,587	6,687	1,529,988	92,036	18,237,118	1,293,653	
	(1950)	44	5,087	138	129,784	3,401	86	6,963	25	35,223	5,526	44	8,554	77	135,877	4,036	113	6,415	4	33,860	4,529	178	18,547	30	123,854	11,806	72	15,842	6	40,027	13,828	6,480	1,456,912	89,200	17,023,513	1,242,777	
	(1949)	42	4,656	118	116,821	3,220	87	6,954	24	36,368	5,327	56	10,364	118	148,354	4,535	109	6,034	3	36,396	4,430	202	20,920	111	132,831	12,917	78	15,952	6	40,392	13,685	6,572	1,439,030	89,386	16,659,973	1,224,951	
	(1948)	39	4,530	105	112,699	3,148	85	6,924	16	35,065	5,033	61	12,078	146	220,776	5,681	97	6,516	20	37,242	4,689	189	23,361	177	126,235	15,047	72	9,468	2	41,821	8,107	6,335	1,423,520	87,596	16,422,774	1,217,154	
	(1947)	41	4,630	80	100,923	3,277	82	6,519	23	28,124	4,738	65	12,556	183	163,300	5,478	93	5,840	20	32,339	4,206	194	22,516	151	140,276	14,739	59	7,577	2	34,268	6,526	6,276	1,425,222	86,378	15,829,514	1,217,229	
	(1946)	42	4,490	110	96,026	3,257	82	6,518	19	26,960	4,700	70	11,497	220	146,836	5,249	97	6,579	30	32,608	3,852	202	21,253	128	144,664	13,566	58	7,808	4	34,231	7,278	6,280	1,468,714	84,145	15,153,452	1,239,454	
	(1945)	44	4,770	81	90,097	3,495	83	6,679	19	29,154	4,781	63	8,406	87	99,599	3,223	102	9,556	32	57,385	7,009	168	17,720	52	112,211	11,093	111	21,814	40	61,621	19,222	6,511	1,738,944	83,131	16,257,402	1,405,247	
	(1944)	44	4,459	39	85,243	3,096	84	6,864	10	29,435	4,673	61	8,300	67	48,387	2,864	109	13,825	34	61,548	7,993	216	24,484	97	153,057	15,927	57	6,252	10	43,265	5,531	6,611	1,729,945	80,791	16,036,848	1,299,474	
	(1943)	40	4,194	19	84,404	2,705	84	7,025	..	34,871	5,020	55	8,313	44	49,570	3,219	126	12,453	42	34,847	8,211	203	20,224	56	141,658	13,280	39	3,884	4	28,188	3,450	6,655	1,649,254	77,134	15,374,698	1,257,124	
	(1942)	43	4,314	44	84,759	2,908	79	7,313	29	36,178	5,516	52	6,279	33	37,936	2,087	139	9,793	40	35,929	8,041	194	18,532	64	145,865	12,300	36	3,501	2	27,370	2,840	6,345	1,383,827	71,448	12,545,610	1,126,028	
	(1941)	52	6,067	337	117,428	4,130	82	7,382	10	38,270	5,691	52	6,356	21	36,399	2,093	136	9,630	36	38,862	7,967	219	27,037	118	174,335	20,593	30	3,122	..	22,764	2,673	6,358	1,324,381	66,163	11,596,188	1,087,039	
	(1940)	46	4,781	137	92,234	3,263	84	7,662	15	37,294	5,858	57	7,350	25	40,513	3,114	142	8,721	35	36,594	6,776	226	21,702	62	156,436	15,318	33	3,230	..	23,463	2,582	6,291	1,226,245	61,939	10,087,548	1,026,171	
	(1939)	48	5,151	146	95,137	3,524	82	7,706	..	36,891	5,752	60	7,100	6	30,279	2,655	139	8,821	36	34,191	6,948	232	25,014	40	160,927	18,200	30	2,706	4	18,882	2,320	6,226	1,195,026	58,764	9,879,244	996,483	
	(1938)	52	5,410	115	93,420	3,761	75	7,125	..	33,386	5,620	54	6,145	17	34,017	2,511	121	5,846	34	36,265	4,305	235	21,808	112	142,714	14,730	63	10,925	4	36,165	7,969	6,166	1,161,380	56,747	9,421,075	965,706	
	(1937)	51	5,389	111	89,584	3,714	75	6,880	10	33,015	5,563	56	6,187	23	37,295	2,633	120	5,566	38	29,411	3,965	240	21,821	61	144,189	14,498	65	9,000	8	44,569	7,933	6,128	1,124,548	55,566	9,221,517	944,436	
	(1936)	52	5,279	150	89,916	3,422	71	6,333	10	30,499	5,127	61	6,896	84	37,053	2,886	130	6,039	38	32,504	4,191	282	25,213	299	157,227	17,831	84	10,033	17	50,608	8,428	6,189	1,096,721	54,225	8,646,885	908,516	
	(1935)	51	4,874	118	83,015	3,115	68	6,394	12	28,280	5,010	66	7,384	70	47,004	3,301	135	6,233	34	28,218	4,437	275	20,793	234	143,434	13,859	89	11,778	48	47,593	10,240	6,246	1,075,139	53,310	7,717,154	875,510	
	(1934)	58	5,386	146	87,571	3,629	69	6,389	12	28,076	5,003	71	7,430	45	38,949	2,934	125	5,456	45	24,083	3,580	312	21,982	310	135,272	14,590	94	8,132	35	36,730	6,462	6,334	1,048,101	53,026	7,147,416	830,098	

military hospitals as compared with 49,275 in 1950. The U. S. Public Health Service lists 10,293 beds, the Bureau of Indian Affairs, 3,259, and other federal hospitals, 8,937. Within the governmental division 25% of the beds are devoted to general hospitalization and 64% to psychiatric care. This is in marked contrast with the nongovernmental group, where the corresponding ratios are 85 and 4.9%. In the nongovernmental classification the church hospitals and other nonprofit associations constitute the largest group. These have a total capacity of 379,956 beds, whereas the individual and partnership hospitals report 27,527 and the corporations unrestricted as to profit 24,785.

When the hospitals are classified by type of service, it is found that the general hospitals have 640,207, or 42% of all beds. This represents an increase of 52,290 over the previous year, the governmental group having gained 41,109, the nongovernmental hospitals 11,181. While the advance was most prominent in the federal classification, there were also gains in all other divisions except the state hospitals and corporations unrestricted as to profit. At present the governmental general hospitals have 273,335 beds, the nongovernmental 366,872. As a group the psychiatric hospitals have the largest number of beds, now totaling 728,187, as compared with 711,921 in the previous year. Thus the present facilities in psychiatric institutions represent 48%, or nearly half, of all hospital beds. The nongovernmental classification, shown in table E, lists 21,263 psychiatric beds, whereas the governmental group reports 706,924, or 97% of the combined total. As indicated previously, the state psychiatric hospitals alone can accommodate 619,151. In the tuberculosis field the number of beds increased from 85,746 to 88,379, a total representing nearly 6% of the hospital beds. This constitutes a net gain of 2,633, with the expansion of 3,197 beds in the governmental group being partially offset by the loss of 564 in the nongovernmental hospitals. The remaining divisions shown in table D have 73,215 beds, or approximately 5% of the total. Reference should also be made to table G, which presents a full summary of hospital data, including detailed information on beds, bassinets, patients admitted, average daily census, and hospital births.

Number of Patients Admitted

Comparative Totals
1950: 17,023,513
1951: 18,237,118

The present report of 18,237,118 hospital admissions in 1951 is higher than any previous total compiled by the American Medical Association. Reference to table 2 will show that the number of admissions, which totaled 7,717,154 in 1935, had increased to 16,257,402 by 1945. Then, after a reduction to 15,153,452 in the following year, the hospital admissions again expanded to 15,829,514 in 1947, to 16,422,774 in 1948, to 16,659,973 in 1949, and to 17,023,513 in 1950. The tremendous increase of 1,213,605 admissions in the last year was shared by both the governmental and the nongovernmental divisions but was more pronounced in the latter group, which reported a net gain of 664,560, as compared with 549,045 in the governmental hospitals.

In the governmental section, which has 71.7% of the beds, the admissions totaled 4,866,415, or 26.7% of all patients admitted in 1951. These include 1,489,581 admissions in federal hospitals, 767,599 in state institutions, 1,066,562 in county hospitals, 1,257,575 in municipal hospitals, and 285,098 in the institutions operating under joint city and county control. In the federal division shown in table F the hospitals of the Veterans Administration reported 455,717 admissions, while those operated by the Army, Navy, and Air Force had a combined total of 875,368, as compared with 477,727 in the previous year.

The nongovernmental hospitals, with 28.3% of the bed capacity, received 13,370,703, or 73.3% of all patients admitted. Included in this group are 1,522,693 admissions in the proprietary hospitals, 5,152,206 in the church hospitals, and 6,695,804 in the other nonprofit associations. Together these nonprofit groups served 65% of the patients in 1951, whereas the proprietary hospitals admitted 8.3%.

When studied in relation to the type of service offered it will be found that the general hospitals admitted 17,065,821, or 93.6% of all patients reported in the present survey. In the governmental division the general admissions advanced from 3,700,597 to 4,292,253, whereas the nongovernmental general hospitals reported an increase from 12,129,573 to 12,773,568. Gains were shown in all control classifications but were most pronounced in the federal, church, and other nonprofit classifications.

The total of 307,010 admissions in the psychiatric hospitals is practically identical with the report of the previous year. While these institutions received only 1.7% of all admissions it should be noted that they maintained an average daily census of 697,521, which is greater than the combined patient load in all other registered hospitals. The average daily census, therefore, illustrates more fully the volume of service carried out in the psychiatric field, where longer periods of hospitalization are necessarily required.

In the tuberculosis hospitals the number of admissions decreased from 113,275 in 1950 to 107,181 in 1951. Reference should also be made to the other services in table D, where a decreased admission rate is particularly noticeable in the isolation hospitals as compared with the previous year. From the same table it may be shown that out of every thousand admissions 936 were assigned to general hospitals, 17 to psychiatric institutions, 6 to tuberculosis sanatoriums, 6 to maternity hospitals, 3 to industrial units, 6 to eye, ear, nose and throat, 7 to children's hospitals, 2 to orthopedic, 6 to isolation, 2 to convalescent units, 7 to hospital departments of institutions, and 2 to other hospitals. Comparative data will be found in tables 1 and 2 as well as in the other statistical compilations, but reference should also be made to the preceding Hospital Number of THE JOURNAL, May 12, 1951. Outpatients and hospital births are not included in the admission totals reported in the present survey.

Average Daily Census

Comparative Totals
1950: 1,242,777
1951: 1,293,653

As shown in the comparative totals of table 2, there was a continuous increase in the average daily census from 1935 to 1945. Although reductions occurred in the next three years, the patient load advanced thereafter to 1,224,951 in 1949, 1,242,777 in 1950 and 1,293,653 in 1951. Of the present total, which does not include newborn infants, an average of 973,072 patients were constantly under treatment in the governmental hospitals, as compared with 320,581 in the nongovernmental group. Increases occurred in all classifications shown in table C but were most pronounced in the governmental section, which can be credited with 75.2% of the total average census in all registered hospitals. In the nongovernmental division the principal gain occurred in the church and other nonprofit hospitals, where the combined census of 286,149 represents 22.1% of the total patient load compared with 34,432, or 2.7%, in the proprietary group.

In the general hospitals the highest average census was listed in 1945, when a total of 665,105 was reported. This declined to 429,443 in 1949 but increased to 433,364 in 1950 and 470,692 in 1951. At present, therefore, the general hospitals, with 42% of the total beds and 93.6% of all admissions, carry 36.4% of the daily patient load in the United States. In the last year the average census in the governmental hospitals advanced from 171,799 to 200,035, whereas the nongovernmental group reported an increase from 261,565 to 270,657. As shown in table G, the latter includes averages of 110,146 in the church hospitals, 138,354 in the other nonprofit associations, 11,062 in the individual and partnership classification, and 11,095 in the general hospitals designated as corporations unrestricted as to profit.

Again it may be shown that in the last year the psychiatric institutions had an average census of 697,521, or 53.9% of the total daily patient load in all registered hospitals. Reference to table E will show that the psychiatric service is chiefly under governmental control, inasmuch as the hospitals in this division reported an average daily census of 680,288 compared with 17,233 in the nongovernmental classification. In table G it may be observed also that the greatest load is in the state psychiatric hospitals, which maintain a constant average of 597,927. While the average census is high in this field, as a result of long periods of hospitalization, it should be mentioned again that the psychiatric hospitals, as a group, received only 1.7% of all patients admitted.

In the tuberculosis division, the average increased from 72,370 to 73,588, the latter representing 5.7% of the total hospital census. Here, as in the psychiatric group, the major responsibility falls on the governmental section, which reported a daily patient load of 65,684 as compared with 7,904 in the nongovernmental classification. The corresponding totals in the previous report were 63,868 and 8,502 respectively. The average census in other groups, representing 4% of the daily patient load, is shown in table D.

The average daily census of 1,293,653 represents a tremendous total of 472,183,345 patient days, including 355,171,280 in the governmental group and 117,012,065 in the nongovernmental division. When classified by type of service, however, the general hospitals show 171,802,580 days of patient care, the psychiatric institutions 254,595,165, the tuberculosis hospitals 26,859,620, and other units 18,925,980.

TABLE H.—*Percentage of Beds Occupied*

	1949	1950	1951
According to Ownership or Control:			
Federal	79.5	77.8	77.3
State	94.2	95.1	94.5
County	83.0	83.6	82.8
City	81.0	82.9	78.6
City-county	74.9	78.4	78.2
Total governmental	89.3	89.8	88.6
Church	78.2	76.6	76.3
Other nonprofit associations	74.7	74.5	74.6
Total nonprofit	76.1	75.4	75.3
Individual and partnership	60.5	60.0	60.1
Corporations (profit unrestricted)	70.7	70.7	72.1
Total proprietary	65.1	65.2	65.8
Total nongovernmental	74.7	74.1	74.1
According to Type of Service:			
General	74.7	73.7	73.5
Nervous and mental	95.7	96.6	95.8
Tuberculosis	83.2	84.4	83.3
Maternity	66.0	65.1	63.8
Industrial	65.4	67.9	66.6
Eye, ear, nose and throat	60.5	57.9	57.9
Children's	69.2	66.9	67.0
Orthopedic	76.6	79.4	77.7
Isolation	43.8	47.2	53.6
Convalescent and rest	73.4	70.6	71.4
Hospital departments of institutions	61.7	63.7	65.8
All other hospitals	85.8	87.3	92.0
Total all hospitals	85.1	85.3	84.5

TABLE J.—*Average Length of Stay Per Patient in General Hospitals, 1949, 1950 and 1951*

	1949	1950	1951
According to Ownership or Control:			
Federal	25.8 days	26.5 days	25.5 days
State	15.4 days	15.0 days	14.6 days
County	14.8 days	13.9 days	13.6 days
City	12.5 days	12.6 days	12.4 days
City-county	11.8 days	11.3 days	10.4 days
All governmental general	17.2 days	16.9 days	17.0 days
Church	8.3 days	8.0 days	7.9 days
Other nonprofit associations	8.3 days	8.2 days	8.0 days
All nonprofit general	8.3 days	8.1 days	8.0 days
Individual and partnership	5.4 days	5.4 days	5.3 days
Corporations (profit unrestricted)	6.4 days	6.5 days	6.3 days
All proprietary general	5.9 days	5.9 days	5.8 days
All nongovernmental general	8.0 days	7.9 days	7.7 days
All general hospitals	10.1 days	10.0 days	10.1 days

Percentage of Beds Occupied

Comparative Totals
1950: 85.3
1951: 84.5

Table H presents information on bed occupancy rates for the past three years based on hospital control and type of service. Compared with 1950 the present survey shows a reduction from 85.3 to 84.5% for all registered hospitals; however, as a group, the nongovernmental hospitals remained at the previous level of 74.1%, whereas the governmental section, with its higher occupancy rate, was reduced from 89.8 to 88.6%. Following the pattern of previous years, the state hospitals again maintain the highest occupancy of 94.5%, which reflects in a large measure the prolonged hospitalization of psychiatric patients. The federal rate was reduced from 77.8 to 77.3%, and there were similar reductions in the

county, municipal, and city-county groups. In the nongovernmental hospitals the increase, which occurred in the individual and partnership group and the corporations unrestricted as to profit, was offset by the loss recorded in the total nonprofit division.

When the hospitals are classified by type of service there is a greater variation in the percentage of beds occupied. The isolation hospitals, which respond mainly to seasonal demands, reported only 53.6%, whereas the psychiatric hospital group had an average occupancy of 95.8. In the tuberculosis field the rate declined from 84.4 to 83.3, and there was a similar reduction in the general hospitals from 73.7 to 73.5%. In this connection, it should be noted that an average occupancy of 80 to 85% is generally regarded as the maximum limit of operating efficiency in general hospitals.

Average Length of Stay

In the general hospitals the average length of stay per patient in 1951 was 10.1 days, based on the reported total of 17,065,821 admissions and 171,802,580 patient days. Reduced totals occurred in all classifications shown in table J, but the governmental general hospitals, as a group, had an average stay of 17.0 days compared with 7.7 days in the nongovernmental hospitals. The average period of hospitalization, therefore, is more than twice as long in the governmental division, where the federal general hospitals reported 25.5 days, the state group 14.6, the county hospitals 13.6, the municipal 12.4, and the city-county 10.4. In the proprietary hospitals the average length of stay is only 5.8 days, whereas the general hospitals in the church and other nonprofit classification report 8.0 days. Further reference should be made to table J, which offers comparative data for the past three years.

The present average of 10.1 days for all general hospitals may be compared with 10.0 in 1950, 10.1 in 1949, 10.5 in 1948, 11.4 in 1947, 12.9 in 1946, and 15.9 in 1945. Since 1945, therefore, the length of stay has been reduced by 5.8 days. This reduction applied to the present total of 17,065,821 admissions in the general hospital group would represent an actual saving of 98,981,762 days of hospital care.

Births in Hospitals

Comparative Totals
1950: 2,815,806
1951: 2,999,371

The present total of 2,999,371 births, as shown in table K, sets a new record in the hospital field. The previous high was in 1947, when 2,837,139 were reported in the hospitals registered by the American Medical Association. The 1948 total of 2,794,281 was increased to 2,820,791 in 1949, but in 1950 the number of births reported was 2,815,806. Compared with 1950 the present report shows a net gain of 183,565, including 70,140 in the governmental division and 113,425 in the nongovernmental group. Reference to table K will show that increases occurred in all hospital divisions classified according to ownership or control. The governmental hospitals reported 572,292, or 19.1% of the total, whereas the nongovernmental had 2,427,079, or 80.9%. Included in the latter group are 245,671 births in the proprietary hospitals and 2,181,408 in the church and other nonprofit associations.

In the general hospitals, the number of births increased in the last year from 2,739,212 to 2,923,509. This total, which represents 97.5% of all hospital births, includes 558,580 in the governmental general hospitals and 2,364,929 in the corresponding nongovernmental group. The maternity hospitals reported 71,343, an increase of 399 over the previous year. The other hospitals included in the service classification had a total of only 4,519. Further reference should be made to table K, which illustrates clearly the tremendous increase that has occurred in the utilization of hospital facilities for maternity care.

TABLE K.—*Births in Hospitals According to Ownership or Control and According to Type of Service*

	1929	1949	1950	1951
According to Ownership or Control:				
Federal	2,296	60,026	61,938	85,935
State	9,125	59,700	62,918	68,477
County	17,527	141,540	151,139	170,425
City	45,787	186,315	182,343	196,733
City-county	8,806	38,714	43,814	50,722
Total governmental	83,541	486,385	502,152	572,292
Church	209,726	944,610	949,955	983,760
Fraternal	1,730	.....	.....	.....
Nonprofit associations	.....	1,121,744	1,126,353	1,197,648
Industrial	4,327	.....	.....	.....
Independent	283,136	.....	.....	.....
Total nonprofit	.....	2,066,354	2,076,308	2,181,408
Individual and partnership	39,436	153,947	128,101	134,539
Corporations (profit unrestricted)	.....	114,103	109,245	111,132
Total proprietary	.....	268,052	237,346	245,671
Total nongovernmental	538,355	2,334,406	2,313,654	2,427,079
According to Type of Service:				
General	566,177	2,744,268	2,739,212	2,923,509
Maternity	53,019	72,274	70,944	71,343
Children's	862	.....	.....	2
Hospital departments of institutions	277	175	341	238
All other hospitals	1,561	4,074	5,309	4,279
Total births in all hospitals	621,898	2,820,791	2,815,806	2,999,371

TABLE L.—*Hospital Births Classified by States*

	Births		Births
Alabama	43,298	Nebraska	29,467
Arizona	18,318	Nevada	2,976
Arkansas	22,954	New Hampshire	11,558
California	209,421	New Jersey	94,449
Colorado	32,027	New Mexico	11,577
Connecticut	41,115	New York	295,935
Delaware	7,360	North Carolina	73,855
District of Columbia	30,668	North Dakota	15,073
Florida	49,634	Ohio	178,122
Georgia	53,405	Oklahoma	34,820
Idaho	14,289	Oregon	32,910
Illinois	182,161	Pennsylvania	211,841
Indiana	89,957	Rhode Island	16,463
Iowa	51,977	South Carolina	31,510
Kansas	37,848	South Dakota	15,593
Kentucky	46,710	Tennessee	52,546
Louisiana	59,492	Texas	158,944
Maine	15,501	Utah	19,770
Maryland	46,887	Vermont	7,915
Massachusetts	93,977	Virginia	56,191
Michigan	147,903	Washington	53,777
Minnesota	72,584	West Virginia	32,991
Mississippi	24,224	Wisconsin	81,011
Missouri	68,680	Wyoming	6,586
Montana	13,191		
		Total	2,999,371

Professional Nursing Service

Comparative Totals

Graduate Nurses	Student Nurses
1950: 205,389	1950: 102,611
1951: 216,047	1951: 103,527

In the hospital survey of 1951, information was obtained on professional nursing personnel and schools of nursing education, as shown in tables M 1, M 2, and M 3.

These compilations reveal that the hospitals registered by the American Medical Association employ 216,047 graduate nurses exclusive of 31,807 on private duty assignments. In the previous report the respective totals were 205,389 and 32,739. While a reduction occurred in the private duty classification, gains were recorded in all other divisions of table M 1, which lists 9,844 administrative nurses, 5,960 full-time instructors, 22,781 supervisors and assistant supervisors, 34,740 head nurses and assistant head nurses, 111,021 full-time general duty nurses, 23,772 part-time general duty nurses, and 7,929 other graduate nurses in unclassified positions. These totals indicate that 134,793, or 62.4%, of the professional nurses are utilized for general bedside care, whereas 73,325, or 33.9%, serve in administrative, supervisory, or educational capacities. The unclassified group of 7,929 represents only 3.7% of the graduate nursing personnel in hospitals.

In table M 2 it will be noted that the federal hospitals employ 24,064, or 11.1%, of the graduate nurses reported, while the other governmental hospitals have 44,278, or 20.4%. The largest number, 147,705, or 68.4%, will be found in the nongovernmental hospitals. As shown in table M 3, the greatest volume of nursing service is in the general hospital group. These institutions, which had over 17 million admissions in 1951, reported 189,122 graduate nurses, compared with 26,925 in all other registered hospitals. The general hospitals also employed 30,653 private duty nurses out of the total of 31,807.

The present total of 1,106 accredited schools of professional nursing is identical with the report of last year. Practically all these schools are in general hospitals, as shown in table M 3, but, in the control classification, table M 2, it will be found that 147 are sponsored by governmental hospitals whereas 959 are in the nongovernmental hospital group. In the listing of accredited schools in the Hospital Register, two symbols are employed to differentiate between institutions conducting schools and those that supply training on an affiliated basis. The diamond symbol (◊) is applied to accredited schools of nursing operated by hospitals individually or under joint hospital and college or university sponsorship, while the circular symbol (⊙) refers to hospitals that provide acceptable supplementary training in a limited field as, for example, pediatrics, psychiatry, tuberculosis, or contagious diseases.

The hospitals conducting schools of professional nursing accredited by the respective State Boards of Nurse Examiners reported a total of 103,527 students,

TABLE M 1.—PROFESSIONAL NURSING PERSONNEL AND SCHOOLS OF NURSING EDUCATION (Classified by States)

State	Student Nurses	Accredited Schools of Nursing	Schools Offering Affiliated Courses Only		Administrative Nursing Personnel	Full Time Instructors	Supervisors and Asst. Supervisors	Head Nurses and Asst. Head Nurses	General Duty Nurses		Nurses Not Classified	Total Graduate Nurses	Private Duty Nurses
			Schools	Students					Full Time	Part Time			
Alabama	1,030	14	2	68	150	72	283	324	1,403	127	95	2,454	243
Arizona	405	4	..	..	70	17	96	144	820	49	36	1,232	108
Arkansas	551	7	1	44	87	27	197	183	551	133	68	1,246	106
California	4,091	42	14	389	602	258	1,282	2,594	11,561	1,255	841	18,493	2,003
Colorado	1,078	12	..	...	140	71	252	394	1,426	332	109	2,724	273
Connecticut	2,128	17	6	216	137	138	376	682	2,110	589	141	4,173	910
Delaware	441	7	..	...	31	24	66	82	301	54	23	581	118
District of Columbia	778	9	1	92	69	63	244	481	1,438	343	105	2,743	353
Florida	976	15	2	45	178	65	438	528	2,364	103	177	3,853	663
Georgia	1,574	12	1	35	178	93	339	481	1,438	56	105	2,690	598
Idaho	434	8	2	35	59	19	112	121	318	91	26	746	52
Illinois	7,302	82	16	936	603	437	1,614	1,917	5,959	1,984	440	12,954	2,074
Indiana	2,547	24	4	168	202	151	454	711	2,121	653	66	4,358	503
Iowa	2,308	27	5	253	196	106	427	456	1,539	627	111	3,462	316
Kansas	1,702	32	..	...	158	69	430	446	1,126	323	98	2,650	212
Kentucky	1,168	12	3	115	153	60	260	420	1,478	170	45	2,586	321
Louisiana	1,049	14	1	74	146	67	283	436	1,520	114	108	2,674	476
Maine	828	10	2	12	81	40	155	200	708	125	69	1,387	255
Maryland	1,857	20	6	295	164	144	761	681	1,565	230	111	3,656	656
Massachusetts	5,753	55	18	795	421	330	1,200	1,988	4,962	1,463	482	10,846	1,654
Michigan	3,233	31	11	598	383	233	823	1,298	4,461	1,578	299	9,075	700
Minnesota	3,538	27	11	668	303	160	578	1,007	2,808	1,033	165	6,054	637
Mississippi	2,800	18	..	...	110	25	199	154	625	31	87	1,231	276
Missouri	3,067	26	11	287	226	139	566	694	2,103	426	206	4,360	693
Montana	650	11	2	86	74	35	154	110	403	170	75	1,021	94
Nebraska	1,096	13	3	93	110	64	226	277	910	311	62	1,960	138
Nevada	...	..	..	...	17	2	28	35	205	17	35	339	49
New Hampshire	679	13	..	...	69	38	130	210	608	92	25	1,172	140
New Jersey	3,043	40	8	435	266	218	666	1,085	3,575	1,158	192	7,160	1,442
New Mexico	59	2	1	3	50	10	71	61	436	47	22	697	81
New York	11,013	91	24	1,716	1,030	687	2,670	5,673	14,061	3,103	1,038	28,262	5,442
North Carolina	2,394	36	6	230	242	124	496	710	2,124	113	237	4,046	658
North Dakota	912	12	..	...	71	41	133	140	403	82	27	897	121
Ohio	5,503	57	13	762	417	373	1,008	1,873	5,399	2,026	242	11,338	1,481
Oklahoma	791	10	1	63	133	44	243	336	692	87	68	1,603	264
Oregon	845	7	3	116	116	61	233	291	1,303	301	130	2,435	266
Pennsylvania	11,323	109	23	1,161	584	609	1,691	2,412	9,311	1,250	430	16,287	3,188
Rhode Island	492	5	4	202	51	54	110	253	700	355	23	1,546	95
South Carolina	1,121	13	2 •	42	89	41	209	307	1,044	68	53	1,811	375
South Dakota	822	9	1	...	79	36	113	164	438	97	52	979	47
Tennessee	1,728	16	2	131	156	94	341	476	1,399	132	106	2,704	481
Texas	2,493	31	3	132	559	160	996	1,174	3,853	302	381	7,425	1,192
Utah	461	6	2	29	45	25	51	107	411	164	21	824	55
Vermont	346	6	..	...	45	19	82	96	399	102	30	773	115
Virginia	2,178	31	4	97	188	132	410	705	1,843	324	184	3,786	862
Washington	1,305	19	8	198	207	97	433	707	2,785	528	143	4,900	289
West Virginia	1,241	20	..	...	119	65	280	278	1,078	89	116	2,025	319
Wisconsin	2,409	25	3	498	245	120	582	675	2,630	903	209	5,314	387
Wyoming	...	..	..	...	35	3	40	54	306	62	15	515	26
Totals	103,527	1,106	230	11,119	9,844	5,960	22,781	34,740	111,021	23,772	7,929	216,047	31,807

compared with 102,611 in 1950. Reference to table M 2 will show that 15,708 of the present group are registered in governmental hospitals, whereas 87,819 are receiving their training in nongovernmental hospitals. It should also be noted that 230 hospitals with acceptable affiliated training programs have a student enrollment of 11,119. The successful wartime nurse recruitment program of the U. S. Public Health Service was continued by the American Hospital Association in 1947 and 1948. Since 1949, however, the major responsibility has been taken over by the Committee on Careers in Nursing, sponsored by the national nursing organizations. The American Hospital Association has continued its support of this program, which has also been aided by the American Cancer Society, the National Foundation for Infantile Paralysis, the Blue Cross Commission, the United Community Defense Services, the American Medical Association, individual nursing associations, and other groups. The enrollment of first year students, which reached its highest point in 1944, when 67,051 applicants were admitted, dropped to 30,899 in 1946. Since that time, however, the new recruitment program, with generous assistance and cooperation from the Advertising Council, has succeeded in raising the freshman enrollment to 44,185, as reported in 1950. Every effort is being made to stimulate further recruitment, as it is generally recognized that well over 50,000 annual admissions in the accredited schools of professional nursing will be necessary to meet the needs in this field.

Auxiliary Nursing Personnel

The training and utilization of practical nurses was recommended by the Committee on Nursing of the American Medical Association in the official report published in THE JOURNAL July 3, 1948, pages 878-879. The following year the registered hospitals reported 242 schools of practical nursing, a number subsequently increased to 318 in 1950 and 334 in 1951. While 108 of the present schools are in governmental hospitals and 226 in the nongovernmental group, it can also be shown that the general hospitals have 264 compared with 33 in psychiatric institutions, 12 in tuberculosis sanatoriums, and 25 in other hospitals. The number of students in the schools of practical nursing totaled 5,050 in 1949, 5,971

TABLE M 2.—PROFESSIONAL NURSING PERSONNEL AND SCHOOLS OF NURSING EDUCATION
(Classified by Control)

Control	Student Nurses	Accredited Schools of Nursing	Schools Offering Affiliated Courses Only: Schools	Schools Offering Affiliated Courses Only: Students	Administrative Nursing Personnel	Full Time Instructors	Supervisors and Asst. Supervisors	Head Nurses and Asst. Head Nurses	General Duty Nurses: Full Time	General Duty Nurses: Part Time	Nurses Not Classified	Total Graduate Nurses	Private Duty Nurses
Governmental													
U. S. Army	...	..	..	...	78	28	210	882	2,276	...	292	3,766	25
U. S. Air Force	...	..	..	...	43	2	61	201	863	...	95	1,265	...
U. S. Navy	...	..	..	...	46	33	594	857	1,251	1	289	3,071	33
U. S. Public Health Service	...	..	1	20	55	5	58	172	810	24	14	1,138	...
Veterans Administration	...	..	12	446	368	228	970	2,344	9,566	80	176	13,732	6
Indian Affairs	...	..	..	...	66	2	10	31	431	7	2	549	...
Other Federal	165	2	..	...	15	12	66	237	207	5	1	543	7
Total Federal	165	2	13	466	671	310	1,969	4,724	15,404	117	869	24,064	71
State	5,178	46	84	4,380	698	517	2,040	3,612	5,933	556	401	13,757	552
County	3,234	32	18	1,632	759	186	1,429	2,131	6,666	1,185	448	12,804	751
City	5,837	50	20	1,198	644	423	1,441	2,570	7,982	1,542	371	14,973	1,275
City-county	1,294	17	4	227	123	75	283	394	1,561	199	109	2,744	296
Total other governmental	15,543	145	126	6,837	2,224	1,201	5,193	8,707	22,142	3,482	1,329	44,278	2,874
Total all governmental	15,708	147	139	7,303	2,895	1,511	7,162	13,431	37,546	3,599	2,198	68,342	2,945
Nongovernmental													
Church	45,716	482	26	1,160	2,150	2,131	6,398	8,114	26,381	6,518	2,028	53,720	9,905
Nonprofit associations	40,705	454	63	2,605	3,563	2,254	7,753	11,732	41,583	12,209	3,097	82,182	16,715
Individual and partnership	334	5	..	...	769	19	652	463	2,680	806	275	5,664	759
Corporations (profit unrestricted)	1,064	18	2	51	467	45	816	1,000	2,831	649	331	6,139	1,483
Total nongovernmental	87,819	959	91	3,816	6,949	4,449	15,619	21,309	73,475	20,173	5,731	147,705	28,862
Total all hospitals	103,527	1,106	230	11,119	9,844	5,960	22,781	34,740	111,021	23,772	7,929	216,047	31,807

TABLE M 3.—PROFESSIONAL NURSING PERSONNEL AND SCHOOLS OF NURSING EDUCATION
(Classified by Type of Service)

Type of Service	Student Nurses	Accredited Schools of Nursing	Schools Offering Affiliated Courses Only: Schools	Schools Offering Affiliated Courses Only: Students	Administrative Nursing Personnel	Full Time Instructors	Supervisors and Asst. Supervisors	Head Nurses and Asst. Head Nurses	General Duty Nurses: Full Time	General Duty Nurses: Part Time	Nurses Not Classified	Total Graduate Nurses	Private Duty Nurses
General	101,913	1,078	44	1,792	7,871	5,319	18,960	28,448	98,877	22,616	7,031	189,122	30,652
N & M	1,415	26	93	5,436	711	406	1,878	3,644	4,393	266	256	11,554	412
Tuberculosis	...	..	40	1,255	536	88	819	1,328	3,468	238	203	6,680	103
Maternity	...	..	9	378	74	26	165	255	544	106	42	1,272	35
Industrial	...	..	..	...	37	...	69	49	460	13	50	678	36
E. E. N. T.	...	..	2	30	55	3	81	97	401	52	71	760	183
Children's	199	2	24	1,439	99	73	177	280	759	96	69	1,553	45
Orthopedic	...	..	8	152	118	7	217	132	443	80	44	1,041	41
Isolation	...	..	9	620	49	15	51	87	326	31	14	573	2
Convalescent and rest	...	..	..	...	100	1	94	94	240	74	15	618	82
Institutions	...	..	1	17	105	9	121	141	663	92	82	1,213	141
All other hospitals	...	..	..	...	89	13	149	185	447	48	52	983	77
Total all hospitals	103,527	1,106	230	11,119	9,844	5,960	22,781	34,740	111,021	23,772	7,929	216,047	31,807

in 1950, and 6,711 in 1951. In the latter group the governmental hospitals list 2,949 students, the nongovernmental 3,762. On further analysis it may be shown that the general hospitals have 4,838, the psychiatric units 1,058, the tuberculosis institutions 241, and other hospitals 574. Reference to table N 1 will show that schools of practical nursing are now represented in all but four states.

In 1950 the number of auxiliary personnel, not counting practical nurse students, totaled 297,310, including 49,880 practical nurses, 131,762 attendants, 64,634 nurses' aides, 26,491 ward maids, and 24,543 orderlies. An almost identical report of 297,466 was obtained in the 1951 survey, but there were differences in individual groups, as indicated by the following totals: practical nurses, 40,816, attendants 127,161, nurses' aides 76,091, ward maids 26,627, and orderlies 26,771. A further classification of the auxiliary nursing personnel by states, hospital control, and type of service will be found in tables N 1, N 2, and N 3.

TABLE N 1.—*Auxiliary Nursing Personnel and Schools of Practical Nursing (Classified by States)*

State	Schools of Practical Nursing	Practical Nurse Students	Practical Nurses Employed	Attendants	Nurses' Aides	Ward Maids	Orderlies
Alabama	4	109	616	1,355	1,670	531	546
Arizona	2	33	247	650	378	143	159
Arkansas	5	57	369	1,513	761	153	130
California	16	529	2,005	12,386	5,271	1,658	2,430
Colorado	8	148	388	2,344	1,079	150	198
Connecticut	5	81	280	1,685	954	510	428
Delaware	2	29	30	368	206	43	47
District of Columbia	2	62	243	2,238	700	302	276
Florida	5	136	865	1,248	1,307	402	648
Georgia	4	124	686	2,041	1,508	666	1,061
Idaho	14	229	247	299	244	93	26
Illinois	8	150	1,453	6,880	5,186	1,362	1,331
Indiana	4	80	783	1,547	2,385	616	297
Iowa	6	182	616	1,380	1,592	376	245
Kansas	1	6	296	1,735	1,864	258	203
Kentucky	2	65	781	1,847	1,261	230	376
Louisiana	4	130	660	1,726	1,347	578	414
Maine	..	...	107	636	280	191	51
Maryland	9	175	802	2,420	1,093	792	991
Massachusetts	17	274	465	7,256	1,558	1,795	1,121
Michigan	20	208	2,215	6,488	3,806	1,049	996
Minnesota	13	294	1,290	1,777	2,642	540	322
Mississippi	5	27	253	1,086	548	252	210
Missouri	8	228	1,199	3,530	2,362	644	412
Montana	2	10	202	301	432	80	55
Nebraska	1	21	341	1,227	1,116	295	132
Nevada	1	75	44	78	129	37	18
New Hampshire	..	...	137	530	133	177	92
New Jersey	3	67	1,061	3,267	1,626	1,312	860
New Mexico	1	8	106	415	348	68	60
New York	23	915	8,896	23,518	5,548	2,485	3,143
North Carolina	10	166	906	1,861	1,376	698	779
North Dakota	2	21	135	297	390	94	50
Ohio	7	135	1,004	5,474	5,907	1,532	867
Oklahoma	5	114	571	1,321	995	185	162
Oregon	3	36	556	499	1,221	216	71
Pennsylvania	12	218	1,247	6,593	3,677	1,664	2,183
Rhode Island	..	...	132	685	156	144	197
South Carolina	2	44	306	631	583	336	520
South Dakota	1	30	178	498	422	90	26
Tennessee	13	197	1,089	1,853	1,403	579	405
Texas	58	846	3,330	4,661	3,909	1,130	2,231
Utah	1	10	213	354	416	73	55
Vermont	2	31	72	388	106	65	24
Virginia	5	120	863	2,104	1,221	709	897
Washington	6	154	1,450	1,797	1,402	315	367
West Virginia	4	47	247	801	1,095	336	435
Wisconsin	8	90	808	3,184	2,291	759	212
Wyoming	..	...	26	449	187	14	12
Totals	334	6,711	40,816	127,161	76,091	26,627	26,771

Special Services

Of the 6,637 registered hospitals included in the present survey, 2,790 reported outpatient departments, 3,614 answered "None," and 233 did not reply. The federal hospitals listed 299 outpatient services, the other governmental institutions 807, the church and other nonprofit associations 1,296 and the proprietary hospitals 388. Outpatient departments were likewise reported in 1,864 general hospitals, 250 psychiatric institutions, 300 tuberculosis sanatoriums, 38 maternity hospitals, 31 industrial, 28 eye, ear, nose, and throat, 28 children's hospitals, 64 orthopedic, 126 departments of institutions, and 61 other units. On the basis of size the following distribution can be recorded: hospitals of 25 beds and under—328 outpatient departments, 26-50 beds—522, 51-100 beds—543, 101-200 beds—525, 201-300 beds—312, 301 beds and over—560.

TABLE N 2.—*Auxiliary Nursing Personnel and Schools of Practical Nursing (Classified by Control)*

Control	Schools of Practical Nursing	Practical Nurse Students	Practical Nurses Employed	Attendants	Nurses' Aides	Ward Maids	Orderlies
Governmental							
U. S. Army	2	126	18	4,387	285	311	1,727
U. S. Air Force	..	...	59	381	153	59	1,286
U. S. Navy	..	...	453	871	81	255	2,341
U. S. Public Health Service	2	17	108	1,289	222	95	43
Veterans Administration	1	10	101	23,850	1,618	497	838
Indian Affairs	1	30	54	309	71	133	54
Other Federal	1	53	172	1,299	7	112	147
Total Federal	7	236	965	32,386	2,437	1,462	5,936
State	43	1,477	3,872	66,654	4,947	1,890	2,487
County	29	581	3,718	8,598	5,815	2,191	2,846
City	23	538	4,273	8,279	4,369	2,611	2,324
City-county	6	117	551	392	1,197	488	940
Total other governmental	101	2,713	12,414	83,923	16,328	7,180	8,597
Total all governmental	108	2,949	13,379	116,309	18,765	8,642	14,533
Nongovernmental							
Church	59	1,191	7,099	2,326	25,105	7,729	3,314
Nonprofit associations	112	1,969	13,329	6,427	28,006	8,361	7,589
Individual and partnership	37	316	4,131	749	2,074	992	623
Corporations (profit unrestricted)	18	266	2,878	1,360	2,141	903	712
Total nongovernmental	226	3,762	27,437	10,852	57,326	17,985	12,238
Total all hospitals	334	6,711	40,816	127,161	76,091	26,627	26,771

TABLE N 3.—*Auxiliary Nursing Personnel and Schools of Practical Nursing (Classified by Type of Service)*

Type of Service	Schools of Practical Nursing	Practical Nurse Students	Practical Nurses Employed	Attendants	Nurses' Aides	Ward Maids	Orderlies
General	264	4,838	29,597	35,449	67,581	21,747	22,499
N & M	33	1,058	3,453	82,170	2,367	1,595	758
Tuberculosis	12	241	4,094	5,291	3,097	1,681	1,789
Maternity	2	50	313	230	445	287	40
Industrial	..	...	82	70	133	120	183
E. E. N. T.	..	...	211	55	201	83	182
Children's	8	92	109	116	681	195	46
Orthopedic	2	16	434	548	724	187	187
Isolation	..	...	112	362	58	240	138
Conv. and rest.	4	81	569	159	321	159	105
Institutions	5	92	872	962	243	108	511
All other hospitals	4	243	970	1,779	240	225	383
Total all hospitals	334	6,711	40,816	127,161	76,091	26,627	26,771

A total of 5,506 hospitals reported laboratory departments, whereas 1,039 gave a negative answer and 92 did not respond. In this group active laboratory services are maintained in 373 federal hospitals, 1,338 other governmental units, 2,816 church and other nonprofit associations, and 978 proprietary hospitals. The general hospitals list 4,343 laboratory departments, the psychiatric

institutions 402, the tuberculosis sanatoriums 354, the maternity hospitals 34, industrial 27, eye, ear, nose, and throat 33, children's units 35, orthopedic 48, isolation 25, convalescent 29, hospital departments of institutions 122, and other hospitals 54. The hospitals of 25 beds and under reported 790 laboratories, 26-50 beds—1,186, 51-100 beds—1,232, 101-200 beds—1,023, 201-300 beds—471, and those of 301 beds or more—804. The federal hospitals list 337 laboratories with physicians in charge, the other governmental units 920, the church and other nonprofit associations 2,313 and the proprietary hospitals 655. Most of the physicians are associated with general hospitals, which reported 3,364 departments under medical supervision compared with 299 in psychiatric institutions, 251 in tuberculosis sanatoriums, and 311 in other hospitals.

X-ray departments total 5,838, with 735 hospitals responding "No" and 64 not replying. Included in the present number are 382 federal hospitals, 1,446 other governmental institutions, 2,929 church and other nonprofit associations, and 1,081 proprietary hospitals. The following distribution occurs with reference to type of service: general hospitals 4,680 x-ray departments, psychiatric institutions 361, tuberculosis sanatoriums 396, maternity hospitals 26, industrial 32, eye, ear, nose and throat 33, children's units 35, orthopedic 63, isolation 20, convalescent 22, hospital departments of institutions 122, and all other hospitals 48. When classified by size it is found that hospitals of 25 beds and under have 985 x-ray departments, those of 26-50 beds, 1,274; 51-100 beds 1,268; 101-200 beds 1,030; 201-300 beds 465; 301 beds and over, 816. The general hospitals list 3,874 x-ray departments with physicians in charge, the psychiatric units 271, the tuberculosis institutions 305, and other hospitals 336. The control classification shows 350 federal departments under medical supervision, 1,038 other governmental institutions, 2,566 church and other nonprofit associations, and 832 proprietary hospitals.

General Practice Sections

In 1945 the American Medical Association established a Section on the General Practice of Medicine. This was followed in 1946 by a recommendation from the House of Delegates that appointments to general practice sections in hospitals be made on the merits and training of individual physicians, and that, as a further clarification, the establishment of such sections should not prevent the approval of hospitals for intern or residency training. This policy of extending hospital privileges on the basis of qualifications is in full accord with the standards of the Council on Medical Education and Hospitals, which declare that the medical staff should be composed of graduates in medicine who are properly qualified by training, licensure, and ethical standing and are proficient in the fields of practice to which they devote themselves. These standards were modified in 1947 to encourage the establishment of general practice sections, at which time it was further emphasized that "hospital staff appointments should depend on the qualifications of physicians to render proper care to hospitalized patients, as judged by the professional staff of the hospital, and not on certification or special society memberships."

To aid in the organization of medical staffs, the American Academy of General Practice has prepared and distributed a Manual on General Practice Departments in Hospitals. This not only contains valuable information on organizational procedure, but serves also as a useful guide in the assignment of hospital privileges, so that the general practitioner may have a better opportunity to discharge his clinical responsibilities in accordance with individual qualifications and demonstrated ability.

The following information obtained last year was again requested in the present survey: (1) Does staff organization include a department of General Practice? (2) Is it modeled after the Manual of the American Academy of General Practice? (3) Are staff privileges in specialty divisions open to qualified general practitioners? On analyzing the hospital data it was found that 1,660 general hospitals reported general practice sections compared with 1,654 in 1950. Of the present total, which represents 34% of all general hospitals, 323 are in the governmental classification and 1,337 in the nongovernmental group. Included in these divisions are 56 federal general hospitals, 11 state institutions, 146 county hospitals, 91 municipal, 19 city-county, 439 church hospitals, 586 other nonprofit associations, 197 individual and partnership units, and 115 corporations unrestricted as to profit. When the hospitals having general practice sections are classified by size the following distribution may be noted: 25 beds and under, 196; 26-50 beds, 458; 51-100 beds, 416; 101-200 beds, 359; 201-300 beds, 148; and 301 beds and over 83. These totals should be compared with the previous report published in THE JOURNAL, May 12, 1951, page 123.

The present report indicates also that 1,202 hospitals have organized their general practice sections in accordance with the Academy plan and that 1,358 have granted qualified general practitioners additional staff privileges in specialty divisions. The corresponding totals in 1950 were 1,075 and 1,333. The further classification of these hospitals by size and control follows in general the same distributional pattern indicated above. General practice sections are reported in all states and the District of Columbia, but the number varies from 2 in Delaware and Rhode Island to 115 in Texas. California reports 110 hospitals with general practice sections, Illinois 100, New York 83, Michigan 76, Ohio 75, Pennsylvania 62, North Carolina 58, and Minnesota 50. In 19 states the number varies from 25 to 49, while the remaining 20 states and District of Columbia report 2 to 24. At present 93 hospitals are approved by the American Medical Association for residency training in general practice.

Standard Nomenclature

The first official edition of the Standard Nomenclature of Disease was published in 1933, and two years later approximately 500 hospitals had adopted this method of classification. Later, when the Standard Nomenclature of Operations was added, in 1942, a total of 1,014 hospitals were reporting the use of standard procedures. This number, which increased to 1,660 the following year, has since expanded to 4,457 in 1950 and 4,748 in accordance with the present survey. A great advance has

thus been accomplished in the establishment of a uniform classification, as 71.5% of the registered hospitals are now utilizing the Standard Nomenclature of Diseases and Operations. Included in the present total are 314 federal institutions, 422 state hospitals, 402 county, 243 municipal, 60 city-county, 890 church hospitals, 1,557 other nonprofit associations, 599 individual and partnership hospitals, and 261 corporations unrestricted as to profit. The Standard classification is likewise employed in 3,612 general hospitals, 427 psychiatric institutions, 291 tuberculosis sanatoriums, 39 maternity hospitals, 21 industrial, 35 eye, ear, nose, and throat, 33 children's units, 62 orthopedic, 20 isolation, 52 convalescent, 111 hospital departments of institutions, and 45 other hospitals. It is also of interest to show that in hospitals of 25 beds and under 717 record departments are utilizing standard procedures. Those of 26-50 beds have 962; 51-100 beds, 1,007; 101-200 beds, 893; 201-300 beds, 436; 301 beds and over 733. Of the 6,637 registered hospitals, 1,070 indicated that they do not follow the standard classification, whereas 819 did not reply.

The Standard Nomenclature has been officially endorsed by the American Medical Association, the American Hospital Association, the American College of Surgeons, and many other medical and surgical societies. As it is highly desirable that a uniform classification be achieved, it is strongly urged that the hospitals that are not included in the above group give serious consideration to the adoption of the Standard Nomenclature, which is suitable for universal use.

Schools of Medical Technology

The approval of schools for laboratory technicians was initially carried out by the American Society of Clinical Pathologists and its Board of Registry, established in 1928. In 1933 the Registry formulated minimum requirements for laboratory schools and published a list of approved training courses following the completion of a questionnaire survey. That same year the American Society of Clinical Pathologists, realizing the need for inspection, requested the Council on Medical Education and Hospitals to aid in the study of courses for the training of laboratory technicians. After a total of 196 schools located in all parts of the country had been visited by the Council's staff, new standards were formulated in collaboration with the Registry and the American Society of Clinical Pathologists. These Essentials of an Acceptable School for Clinical Laboratory Technicians were adopted by the Council on May 10, 1936, and approved by the House of Delegates of the American Medical Association on May 13, 1936. Revisions of the Essentials occurred in 1941, 1943, 1947, and 1949; in 1947 the title was changed to Essentials of an Acceptable School for Medical Technologists.

The first list of schools for medical technologists conforming to the standards adopted by the American Medical Association in 1936 was published Aug. 29 of that year. It contained the names of 96 schools, with an enrollment of 701 students. In subsequent years the number of approved schools increased to 152 in 1940, 268 in 1945, 467 in 1950, and has now reached a total of 496.

During the Atlantic City meeting of the American Medical Association in June 1949, the Council on Medical Education and Hospitals reviewed its functions and responsibilities in relation to the inspection and approval of technical schools. It was agreed that the Council should maintain supervision of the educational standards of technical schools and also continue to be the agency to accredit these schools. It was recognized, however, that with the growing number of technical schools it would not be possible for the staff of the Council to continue to be responsible for carrying out inspections. In conformity with the Council's request, therefore, a Conference on Medical Technology was held Sept. 10, 1949, and, after a careful consideration of the problems involved and the urgent need for closer supervision of the training programs in laboratory schools, it was the consensus that the American Society of Clinical Pathologists and the Council on Medical Education and Hospitals endeavor to develop a program utilizing voluntary regional inspectors to survey the approved schools of medical technology and review all new applications. To assist in carrying out such a plan a Board of Schools of Medical Technology was established by the American Society of Clinical Pathologists. As an initial step, the Board, in cooperation with the Council, instituted a questionnaire survey in August, 1950, and to date reports have been received from practically all of the 496 schools currently approved. From this material a preliminary evaluation has been made to determine the number of schools fully acceptable under the present standards and those requiring further assistance in the reorganization of individual training programs. It was recognized, however, that final evaluation would necessitate further investigation and, accordingly, the American Society of Clinical Pathologists at its meeting in Chicago, Oct. 17, 1951, authorized the Board of Schools of Medical Technology to develop an inspection program that would cover all the approved medical technology schools. While final arrangements have not been made, it is anticipated that volunteer regional inspectors will be employed. Inspection reports will first be reviewed by the Board of Schools of Medical Technology, but the final decision as to approval or disapproval will, as in the past, rest with the Council on Medical Education and Hospitals. The Board is also cooperating with the Council in the evaluation of new applications.

The great majority of the 496 approved schools of medical technology are conducted in the department of clinical pathology of the larger hospitals. In contrast with an enrollment of 701 in 1936, current reports indicate that 3,518 students are now in training, as compared with 3,312 in 1950 and 3,119 in 1949. The number of graduates reported for 1951 was 2,220, an increase of 209 over the previous year. Only 417 of the 496 approved schools are included in this last summary, however, as the remaining 79 schools failed to report graduates for 1951. This is due, in part, to the initiation of new programs, suspension of training programs pending reorganization of established courses, or the failure of applicants to satisfy prerequisite entrance requirements. During the past year, 30 schools received approval, and one course was discontinued. The minimum entrance requirement of two years' college work in a college or university accredited by a recognized standardizing association is in effect in 381 of the approved

schools; 46 require a degree, 67 three years of college, and the remaining two schools specify two and one-half and three and one-half years.

The present revision of the approved list shows that an increasing number of colleges and universities are affiliated with hospital training programs in medical technology. In the past year 282 approved hospitals reported college or university affiliation, as compared with 250 in 1950. Basic sciences and the regular academic requirements occupy the first three years in college, the fourth year being given over to instruction and practice training in hospital laboratories with which the educational institutions are affiliated. This training, as a rule, leads to a degree of Bachelor of Science in Medical Technology.

Adherence to established standards is again noted in connection with the length of the training reported by individual schools. In this connection, 419 hospitals have reported a minimum of 12 months, whereas 77 offer courses of 13 to 25 months. A large majority of the training programs are open to men students.

Application for approval of a school for medical technologists should be made to the Council on Medical Education and Hospitals of the American Medical Association, 535 North Dearborn Street, Chicago 10, Ill. Forms will be supplied for this purpose on request. They should be completed by the hospital pathologist in cooperation with the administrator of the institution requesting approval. Inquiries regarding the registration of qualified medical technologists should be addressed to the Registry of Medical Technologists, 700 South Council Street, Muncie, Ind.

Schools for X-Ray Technicians

The approval of schools for x-ray technicians was originally carried out by the American Registry of X-Ray Technicians sponsored by the American College of Radiology and the American Society of X-Ray Technicians. In June, 1943, at the request of the Registry, a resolution was presented to the House of Delegates of the American Medical Association by the Section on Radiology, inviting the Association to establish standards, inspect schools, and publish lists of acceptable institutions. The resolution was adopted by the House of Delegates, and the Council on Medical Education and Hospitals was asked to carry out these functions. Essentials of an Acceptable School for X-Ray Technicians were subsequently prepared by the Council in cooperation with the Registry and the American College of Radiology. These were adopted by the House of Delegates in 1944. On Jan. 13, 1945, the Council published its first list of 112 approved schools, which reported a maximum enrollment of 478. Since that time the approved schools have increased to 310, and the number of students to 1,907.

At its meeting in Atlantic City, June 3, 1949, the Council on Medical Education and Hospitals recommended that a conference be held with the American College of Radiology to consider the need for further revision of the Council's standards and the establishment of a cooperative plan for the continued approval and inspection of x-ray schools. This meeting took place in Chicago Sept. 12, 1949. It was subsequently indicated by the American College of Radiology that state councilors would participate in the inspection of x-ray schools and that copies of their reports would be forwarded to the office of the Council. A survey form was prepared by the College, with the assistance of the Council.

The program of inspection by the College was placed in operation early in 1951, plans having been completed on March 19, 1951. It provided for a survey of individual schools by state or regional councilors of the College, an evaluation of all data by an advisory committee, a further review by the Board of Chancellors of the College, and final consideration by the Council on Medical Education and Hospitals. Briefly, the evaluation procedure concerns such items as the adequacy of didactic instruction, proper supervision of technical activities, desirable ratio of student technicians to instructors, satisfactory amount of teaching material, suitable hospital facilities, sufficient resources, and general conformity with present standards. The initial survey has now been completed, and the reports forwarded to the Council show that the great majority of the schools are operating in general conformity with the present standards. Minor deficiencies have been called to the attention of 29 schools, and there were only 6 that would seem to require a complete reorganization of their training programs. These have been informed of the existing deficiencies and will be reinspected within the year. Excellent cooperation was extended by the various schools, which in turn received valuable help and guidance from the regional inspectors. At a meeting of the Board of Chancellors of the American College of Radiology held in Chicago in September, 1951, a recommendation was adopted (1) that the College continue to inspect hospitals applying for x-ray approval and that such inspections be evaluated on the system already adopted; (2) that schools failing in certain essentials to meet requirements be reinspected within a year; and (3) that schools under new directorship again be surveyed. This program is in continuous operation and is giving valuable assistance to the Council.

During the past year 28 additional schools have been approved for the training of x-ray technicians, while one course was discontinued. This has increased the number of approved schools to 310, which report a maximum enrollment of 1,907 students, compared with 1,653 in 1950 and 1,447 in 1949. A total of 1,080 graduates were reported by 278 schools, an increase of 157 over the previous year. The minimum entrance requirement of four years of high school is in effect in 288 approved schools, the remaining 22 schools specifying one to three years of college training or an R. N. degree. A further analysis of the data submitted by the approved schools reveals that the duration of the curriculum in 145 schools is 12 months; 120 programs are organized on a 24 months' basis, as compared with 89 last year, while the length of training in the remaining 45 schools varies from 15 months to four years.

The Essentials specify that acceptable schools may be conducted by approved medical schools, general hospitals, or x-ray departments affiliated with a general hospital. Application for approval should be submitted to the Council on Medical Education on Hospitals, 535 North Dearborn Street, Chicago 10, Ill. Inquiries re-

garding registration of qualified technicians should be addressed to the American Registry of X-Ray Technicians, 2900 East Minnehaha Parkway, Minneapolis, Minn.

Schools of Physical Therapy

From 1928 to 1936 the approval of physical therapy schools was carried out by the American Physical Therapy Association. However, at the request of that organization a resolution was presented to the House of Delegates in 1934 asking that the American Medical Association undertake the inspection and approval of training programs in this field. The resolution was referred to the Board of Trustees, and the Council on Medical Education and Hospitals was requested by the Board to proceed with the survey. Inspections of 35 schools for physical therapists were subsequently made in connection with the regular field work of the Council's staff. Complete information was secured regarding the organization, faculty, entrance requirements, curriculum, physical facilities, records, and affiliations of each school. Essentials of an Acceptable School for Physical Therapy Technicians were prepared by the Council on Medical Education and Hospitals in collaboration with the Council on Physical Medicine of the American Medical Association, the American Congress of Physical Medicine, and the American Physical Therapy Association. These were adopted by the House of Delegates of the American Medical Association at the Kansas City session, May 9, 1936. Subsequent revisions were made in 1938, 1939, 1943, 1947 and 1949, and the present designation of Essentials of an Acceptable School of Physical Therapy was authorized in 1949.

The first list, published in August, 1936, contained the names of 13 schools considered acceptable in accordance with the existing standards. This number has since expanded to the present total of 31 schools. Reports received from these schools show a maximum enrollment of 723 students, an increase of 40 over the previous year. There were 498 graduates in the regular course and 93 in the graduate course, corresponding figures for 1950 being 394 and 96 respectively. Again it will be noted that courses are so arranged that various entrance requirements qualify students for training. These include graduation from an accredited school of nursing, graduation from an accredited school of physical education, or two or more years of college with satisfactory courses in biological and physical sciences. When high school graduates are admitted to courses sponsored by colleges or universities, a degree is granted after completion of the prescribed college and technical training. The tuition in all teaching centers closely parallels college fees.

In view of the continued shortage of ancillary personnel in physical therapy, the Council on Medical Education and Hospitals was requested by the Council on Physical Medicine and Rehabilitation of the American Medical Association to encourage the development of additional courses in teaching hospitals affiliated with medical schools. Acting on this suggestion, the Council on Medical Education and Hospitals at its meeting in Cleveland, Dec. 4, 1950, voted that a letter be sent to each medical school calling attention to the need for further facilities for the training of physical therapists. From replies to this communication and subsequent studies and contacts it is apparent that a number of medical schools are considering the development of training courses in this field. Where educational programs are already in operation the schools are cognizant of the existing shortages and are prepared to maintain enrollments at the highest level consistent with good teaching.

Schools of physical therapy may be established in medical colleges and hospitals approved by the Council on Medical Education and Hospitals of the American Medical Association, or in colleges and universities affiliated with acceptable hospitals and accredited by the respective regional associations of colleges and secondary schools.

Application for approval of physical therapy schools should be made to the Council on Medical Education and Hospitals, 535 North Dearborn Street, Chicago 10, Ill. Forms will be supplied on request. Inquiries regarding the registration of qualified therapists should be addressed to the American Registry of Physical Therapists, 30 North Michigan Avenue, Chicago 10, Ill.

Schools of Occupational Therapy

In March, 1931, the American Occupational Therapy Association requested the American Medical Association to undertake the inspection and approval of occupational therapy schools. Two years later, in June, 1933, a resolution was presented to the House of Delegates requesting that plans be effected for the establishment of standards, ratings, and inspections of training schools in occupational therapy. This request was referred to the Board of Trustees and later submitted to the Council on Medical Education and Hospitals and the Council on Physical Medicine for consideration and investigation. Because of its experience in medical education and the investigation of medical schools, teaching hospitals, and technical training, the Council on Medical Education and Hospitals was asked to undertake a survey in this field. The inspection work was begun in November, 1933, and was carried out in conjunction with the other activities of the Council. Thirteen schools were visited, but only 10, including one Canadian school, were found to be in active operation. Following the completion of the inspection program, joint meetings were held with representatives present from the American Occupational Therapy Association, the Council on Physical Medicine, and the Council on Medical Education and Hospitals. These concerned chiefly the development of standards, which were adopted by the Council in February, 1935, and later ratified by the House of Delegates at the Atlantic City session of the American Medical Association the following June. The Essentials of an Acceptable School of Occupational Therapy were published in THE JOURNAL, May 4, 1935, Aug. 31, 1935, and Aug. 29, 1936. In the two year period that followed the adoption of the original standards, further studies were made to test the practicability and applicability of the Essentials. As further changes seemed desirable in relation to subjects and hours and the possible concentration of technical training in selected fields, a new revision was approved by the Council on Medical Education and Hospitals in

February, 1938. The revised Essentials were published in THE JOURNAL, March 25, 1938, together with a list of six approved schools, five in the United States and one in Canada.

The Essentials currently in use were adopted by the House of Delegates in December, 1949. Changes related chiefly to the organization of the faculty, medical direction of the clinical training program, and the planning of the school curriculum and were made with the assistance of the Council on Physical Medicine and Rehabilitation of the American Medical Association and the American Occupational Therapy Association.

In view of the continued shortage of ancillary personnel in occupational therapy, the Council on Medical Education and Hospitals was requested by the Council on Physical Medicine and Rehabilitation of the American Medical Association to encourage the development of additional courses in teaching hospitals affiliated with medical schools. Acting on this suggestion, the Council on Medical Education and Hospitals at its meeting in Cleveland, Dec. 4, 1950, voted that a letter be sent to each medical school calling attention to the need for further facilities for the training of occupational therapists. From replies to this communication and subsequent studies and contacts it is apparent that a number of medical schools are considering the development of training courses in this field. Where educational programs are already in operation the schools are cognizant of the existing shortages and are prepared to maintain enrollments at the highest level consistent with good teaching.

During the past year, one school of occupational therapy was added to the list of approved training courses, bringing the number of schools now meeting minimum standards to 25. The 24 schools previously approved reported 418 graduates in 1951, as compared with 377 in 1950. During the same 12 months' period the enrollments increased from 1,893 to 1,971. It should be noted that the training in some schools is on two levels, the duration of the course, entrance requirements and tuition varying with the type of educational program offered. There are 22 courses designed for high school graduates, who are expected to devote four to five academic years to complete the combined college and professional training. A college degree is specified as an entrance requirement in 13 courses.

Application for approval of occupational therapy schools should be made to the Council on Medical Education and Hospitals, 535 North Dearborn Street, Chicago 10, Ill. Forms will be sent on request. Inquiries regarding registration of qualified therapists should be addressed to the American Occupational Therapy Association, 33 West 42d Street, New York 18, N. Y.

Schools for Medical Record Librarians

At the request of the American Association of Medical Record Librarians a formal resolution was presented to the 1942 session of the House of Delegates asking that the American Medical Association assume responsibility for the approval of schools for medical record librarians. Favorable action on the resolution granted the Council on Medical Education and Hospitals authority to establish standards, inspect training programs, and publish lists of approved schools. Minimum essentials were formulated with the assistance of the American Association of Medical Record Librarians after all existing schools were inspected. These Essentials were officially accepted by the House of Delegates in June, 1943, and immediately thereafter the first list of 10 approved schools was published. Subsequent revisions of the Council's standards were made in 1945 and 1949, and additional changes are under consideration at the present time, particularly in relation to faculty requirements, the qualifications for school directors, and further clarification of the practical phase of the training program.

Since the publication of the initial list the training courses have continued to expand, until at present 21 schools hold official Council recognition. These have a maximum enrollment of 176, as compared with 157 the previous year. Eleven of the 21 approved schools are affiliated with colleges or universities, and degrees are offered by 5 schools. However, fewer graduates were reported the past year, the number dropping from 83 in 1950 to 58 the last 12 months. The course of training is 12 months in 17 schools and 4 years in the remaining 4 schools. Entrance requirements of the approved schools are designed for high school graduates in four instances, these training programs being integrated with a four year college curriculum. Other courses are open to students having completed two and three years of college or acceptable nurse training. One school limits its enrollment to college graduates.

Application for approval should be made to the Council on Medical Education and Hospitals of the American Medical Association, 535 North Dearborn Street, Chicago 10, Ill. Special forms will be supplied for this purpose, and when the required information has been received the proposed training program will be reviewed in collaboration with the Council on Education of the American Association of Medical Record Librarians. The institutions applying for Council approval will, in all instances, receive full information and every possible assistance in the planning and development of training programs in accordance with present standards. Inquiries regarding the registration of qualified medical record librarians should be addressed to the American Association of Medical Record Librarians, 510 North Dearborn Street, Chicago 10, Ill.

Lists of Technical Schools

The lists of hospitals and technical schools included in THE JOURNAL in previous years have been revised and published as a separate supplement. In the individual fields of medical technology, x-ray technique, physical therapy, occupational therapy, and medical record library science full information is given with reference to the name and location of each school, college affiliations, directors of schools, entrance requirements, length of training, number of students, and annual tuition. These lists, which contain the names of all technical schools currently approved by the Council on Medical Education and Hospitals of the American Medical Association, will be given wide distribution, with additional copies available on request.

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LIST OF REGISTERED HOSPITALS

The list of hospitals published in THE JOURNAL in previous years is not included in the present issue. It has been printed as a separate supplement, however, and will be distributed to all hospitals, medical schools, state medical associations, editors of state medical journals, state boards of medical examiners, state and national hospital organizations, state health officers, state boards of nurse examiners, and other agencies associated with hospital services.

Copies of the hospital list are also available to individual physicians and other subscribers to THE JOURNAL and may be obtained by communicating with the Council on Medical Education and Hospitals of the American Medical Association.

HOSPITAL SERVICE IN THE UNITED STATES

The annual hospital report of the Council on Medical Education and Hospitals published in this issue of THE JOURNAL shows again a continued increase in the utilization of hospital service in the United States. In 1951 the 6,637 hospitals registered by the American Medical Association set a new record with 18,237,118 patients admitted. This number not only represents a net increase of 1,213,605 in the last 12 months but also constitutes a far higher total than has been reported in previous years. The tremendous increase in hospital admissions in the last year was shared by both the governmental and the nongovernmental divisions but was more pronounced in the latter group, which reported a net gain of 664,560, as compared with 549,045 in the governmental hospitals. It is also shown in the present report that the nongovernmental hospitals received 13,370,703, or 73.3% of all patients admitted, whereas the governmental hospital group had 4,866,415, or 26.7%. These totals do not include 2,999,371 hospital births, which exceed by a considerable margin the previous record of 2,837,139 in 1947.

Again the greatest volume of service was reported in the general hospitals, which had an increase of 1,235,651 patients in 1951. These institutions, now totaling 4,890, listed 17,065,821, or 93.6% of all patients admitted and 2,925,509, or 97.5% of the hospital births. They also maintained throughout the year an average daily census of 470,692, or 36.4% of the daily patient load in all registered hospitals. The present total of 307,010 admissions in the psychiatric hospitals is practically identical with the report of the previous year. While this is only 1.7% of all patients admitted, the average daily census of 697,521 is the highest ever recorded in the psychiatric field and represents a total greater than the combined census of all other hospital groups. It can also be shown that the hospitalization of psychiatric patients is mainly under governmental control, inasmuch as the hospitals in this division had an average census of 680,288, as compared with 17,233 in the nongovernmental group. In the tuberculosis hospitals the number of admissions was reduced in the last year from 113,275 to 107,181. Here, as in the psychiatric field, the institutional care is largely a function of the governmental hospitals, which admitted 92,953 patients, while the nongovernmental units received only 14,228. In all registered hospitals the average daily census of 1,293,653 represents a total of 472,183,345 patient days, including 171,802,580 in the general hospital group, 254,595,165 in the psychiatric institutions, 26,859,620 in the tuberculosis hospitals, and 26,859,620 in other units. When classified by control the governmental division shows 355,171,280 days of patient care, whereas the nongovernmental hospitals had 117,012,065.

In 1951 the bed capacity of the registered hospitals increased by 73,076 and has now reached a total of 1,529,998, including 1,097,720 in governmental hospitals and 432,268 in the nongovernmental group. The general hospitals report 42% of all beds, the psychiatric institutions 48%, the tuberculosis hospitals 6%, and the other units approximately 5%. The average bed occupancy was reduced in the last year from 85.3 to 84.5%. The nongovernmental hospitals remained at the previous level of 74.1%, but the governmental division showed a reduction from 89.8 to 88.6%. In this group the state hospitals show the highest rate: 94.5%, which reflects in a large measure the prolonged hospitalization of psychiatric patients. A further reduction has also occurred in the general hospital field, which now shows an average occupancy of 73.5%. The average length of stay per patient in the general hospitals varies from 5.3 days in the individual and partnership hospitals to 25.5 days in the federal group. The church and other nonprofit hospitals reported 8.0 days, the city-county group 10.4, the municipal hospitals 12.4, the county institutions 13.6, and the state hospitals 14.6. The average for all general hospitals was 10.1 days as compared with 15.9 in 1945. This reduction of 5.8 days, applied to the present total of 17,065,821 admissions in the general hospital group, represents an actual saving of 98,981,762 days of hospital care.

The hospitals are continuing their full support of educational activities, with an increasing number of institutions participating in the training of medical students, interns, resident physicians, student nurses, technicians, and other hospital personnel. At present 865 hospitals are approved for internships and 1,131 for residency training. The 1,106 accredited schools of professional nursing reported a student enrollment of 103,527, while 334 additional schools for practical nurses have 6,711 students in training. In the technical fields approval has been extended to 496 schools of medical technology, 310

schools for x-ray technicians, 31 schools of physical therapy, 25 schools of occupational therapy, and 21 schools for medical record librarians. While the registered hospitals are primarily engaged in the care of the sick, they should also be commended for their generous support of the many educational functions essential to the maintenance of high standards and quality of hospital service.

TECHNICAL PERSONNEL

The present report on hospital service in the United States considers also the ancillary divisions of medical technology, x-ray technique, physical therapy, occupational therapy, and medical record library science. In all of these fields the Council on Medical Education and Hospitals has worked in close cooperation with the respective national organizations to develop standards for the training of technical personnel and to encourage the organization of suitable educational programs in hospitals, medical schools, colleges, and universities. While much progress has been made since the Council began its activities with technical schools in 1933, it is well recognized that personnel shortages exist in all fields and are continuing to increase in view of present emergency needs and the additional demands created by new and advanced methods of therapy and rehabilitation. Every effort, therefore, is being made to develop additional schools, to expand existing educational services when suitable facilities are available, and to intensify and coordinate the recruitment of student personnel on both a national and a local level.

A continued expansion of educational services has occurred in most of the technical fields. In the period 1947-1951, for example, the approved schools of medical technology increased from 337 to 496 and the annual number of graduates from 1,206 to 2,220. Courses in x-ray technique showed similar gains, with schools advancing from 211 to 310, while graduates increased from 499 to 1,080. The field of medical record science was represented by 12 schools and 63 graduates in 1947, whereas the present survey shows totals of 21 and 58 respectively. In occupational therapy, where the present report lists 25 schools and 418 graduates, there has been relatively little change in recent years; however, in physical therapy the approved schools advanced from 25 to 31 and the number of graduates from 403 to 591. The Council is receiving full cooperation in the standardization of technical training programs. The American College of Radiology has, in the last year, completed a survey of the approved x-ray schools and is continuing to assist the Council in the further inspection of individual schools and in the evaluation of new applications. A similar program has been developed in medical technology, where field investigations and the evaluation of new schools will be accomplished through the cooperation of the Board of Schools of Medical Technology of the American Society of Clinical Pathologists. The American Physical Therapy Association, the American Occupational Therapy Association, and the American Association of Medical Record Librarians are also giving every assistance in their respective fields.

ERADICATION OF MALARIA

The introduction of insecticides, such as DDT, has initiated a new stage in the history of malaria. The effect of the residual sprays with toxicants of various types has demonstrated the economic feasibility of nationwide malaria eradication. There are indications that in some countries, particularly in the United States, the epidemiology of malaria has been greatly modified.

Russell,[1] in a recent review, stresses that although these local victories are important they have not yet greatly reduced the total world incidence of malaria. Exact data on its incidence do not exist, since only a small number of cases are reported officially. Russell estimates that among the world's total population of 2,378,000,000 there occur annually some 350,000,000 cases of malarial fevers, with a mortality rate of about 1%. These figures offer a fair idea of the magnitude of the task of eradicating the disease. Malaria has always been one of the major scourges of the human race. Malaria was an important factor in the decline of moral and intellectual vigor that took place in Greece between 300 and 500 B. C. In India, it is today the major cause of poverty and of lowered physical and intellectual standards.

In the United States the decline in the incidence of malaria began about 1875; however, as late as 1915, the U. S. Public Health Service estimated, on the basis of a survey of 12 southern states, a million cases of malaria annually among a population of 25 million. In 1949 there appeared to be 19 primary cases and in 1950 only 7, in 13 southern states.

In speculating on the causes of the recession of malaria in the United States, Russell calls attention to the fact that there has been no significant change in the invasive properties of the parasite, the vectorial powers of the mosquito, or the immune defenses of the population. He presumes, therefore, that there must have been a reduction in the numbers of the vector, Anopheles quadrimaculatus. Many factors have contributed to the diminution in the numbers of the mosquitos. As pointed out in an earlier editorial in THE JOURNAL (Aug. 25, 1951), land improvements, extensive antimosquito drainage since 1915, and the more recent introduction of residual spraying with insecticides are some of these.

In the over-all problem of malaria eradication, vector reduction could be only one factor. Other factors, suggested by Russell, are the economic advance of the South, permitting better housing and education, greater use of physicians, hospitals, therapeutics, and prophylactic drugs, insecticides, screening, and other antimosquito measures.

The recent advances in the campaign for control of malaria give rise to new questions. Will anopheline resistance to residual insecticides become a significant factor; is malaria control advisable in holoendemic areas where the population has strong tolerance to the disease; and is malaria control advisable in areas that now are or that may be overpopulated? As to the holoendemic areas it is logical to suppose that discontinuance of efforts

1. Russell, P. F.: The Present Status of Malaria in the World, Am. J. Trop. Med. 1: 111-123 (Jan.) 1952.

at control could be followed by epidemics after the community has lost its tolerance. The subject of increased populations belongs in a larger domain of human effort and is the concern of social scientists, economists, and agriculturists. Control of overpopulation by maintenance of a disease would be contrary to human rights.

RELATIONSHIP BETWEEN INOCULATIONS AND POLIOMYELITIS

The State and Territorial Health Officers Association requested the U. S. Public Health Service to sponsor a study and issue a clarifying statement on the possible relation between various types of inoculation and poliomyelitis. Subsequently, the Public Health Service, on March 14, 1952, sponsored a meeting of 42 poliomyelitis investigators, epidemiologists, pediatricians, allergists, and health officers. The National Foundation for Infantile Paralysis participated in the conference and helped in planning it.

The conference voted unanimously in favor of the conclusions contained in the following statement, which has been accepted by the Public Health Service and is being transmitted to official health agencies, to the medical profession, and to the public:

"There is no definite evidence that an increase in the number of cases of poliomyelitis has occurred as a result of injections of vaccines, drugs, and other medicinal agents. There is evidence that injections for the prevention of diphtheria, whooping cough and possibly tetanus, when given during an epidemic of poliomyelitis, may, on rare occasions, localize the paralysis in the inoculated arm or leg. There is no satisfactory evidence that other types of injections have any effect on the localization, frequency or severity of poliomyelitic paralysis. In the small number of persons with localization of paralysis in the inoculated limb, the injections, for the most part, were given about 7 to 21 days prior to onset, which corresponds to the usual incubation period of poliomyelitis. This has raised the question as to whether or not inoculated persons have a greater chance of contracting poliomyelitis during an epidemic.

"There is as yet no final answer to this question, but it is a fact that, even if there should be an increased chance, it is extremely small. Many thousands of poliomyelitis cases occur every year among children who have not had any injections during the preceding few months, and thousands of children have received injections for whooping cough, diphtheria and tetanus during poliomyelitis epidemics and have not developed the disease.

"Diphtheria, tetanus and whooping cough are serious diseases which can be prevented by immunization. Unchecked, these diseases present a far greater hazard than poliomyelitis. The benefits derived from immunization against these diseases far outweigh the questionably small increased chance of contracting poliomyelitis. However, even this questionable risk can be avoided by carrying out these immunizations when poliomyelitis is not epidemic in the community. There appears to be no good reason for withholding these immunizations during the summer months in communities that are not having an epidemic of poliomyelitis.

"Furthermore, poliomyelitis is at all times so rare in infants under 6 months of age, and the danger from other infectious diseases, particularly whooping cough, is so great, that it is advisable to continue the immunization procedures for this age group even during a poliomyelitis epidemic. In adults also, poliomyelitis is relatively so infrequent, that when there is a need for immunizing or therapeutic injections, such injections should not be withheld.

"Certainly no parent should object and no physician should hesitate to administer a needed antibiotic, drug or other injection for treatment of disease at any time. When there is immediate danger from diphtheria, whooping cough or tetanus, the preventive inoculations should be given to all threatened age groups even during a poliomyelitis epidemic. In the final analysis the decision as to when an immunizing or therapeutic injection shall be given to an individual patient must rest with the physician."

INDIGENT MEDICAL CARE STUDY

The House of Delegates authorized in December, 1948, the creation of seven committees within the framework of the Council on Medical Service. Each committee has been concerned with a specific part of the general medical service field. The combined efforts of these committees will provide information on medical care activities and programs now being carried on that will assist the Council in developing plans for improving medical care throughout the nation.

One of these committees, the Committee on Indigent Care, has completed a general survey of plans throughout the United States showing the variations in approach to this problem and the extent to which medical societies officially participate in indigent programs. From the data collected it is evident that medical societies, both state and county, need to become more interested in medical care for the indigent in order that adequate programs may be developed.

To assist medical societies in meeting this problem, the committee has undertaken a series of studies of 12 community and four state indigent medical care programs, each of a different type. Since the primary interest of the committee is in physician participation, the study has been directed toward obtaining data that will enable the committee to evaluate the programs and make recommendations as to medical society participation.

Elsewhere in this issue of THE JOURNAL, the first article in a series to be published considers Erie County (Buffalo) New York as the study unit. In that county, a well-coordinated complete service program for the indigent has been developed. According to the committee, "the Erie County Indigent Medical Care Plan accomplishes the primary objective of any such plan. It makes available to the indigent sick all of the medical, hospital, and related services available to other citizens of the community and does this with a minimum of disturbance in the normal physician-patient relationship. Further, it has succeeded in partially compensating private physicians on a fee basis and in utilizing all available facilities, private and public, at a minimum of cost to the taxpayer."

ORGANIZATION SECTION

MEDICAL AID IN THE MISSOURI FLOOD AREAS

Stories of heroism and sacrifice are emerging from the muddy floodwaters of the mighty Missouri River, which surged through the Dakotas, Iowa, and Nebraska, leaving 2 million acres of farmland inundated, 130,000 persons homeless, and damage in excess of 2 million dollars. The little-told story of the part that physicians and nurses played all along the 1,000-mile front during the past few weeks is one of the bright chapters in American medicine.

James F. Mulqueen, mayor of Council Bluffs, Iowa, where almost the entire population of 45,000 joined with thousands of Army troops and National Guardsmen in a feverish, successful fight against the flood waters, expressed "grateful thanks to the doctors and nurses who gave aid to the sick and injured." Dr. Raymond F. Barnes, medical director for the midwestern area of the American Red Cross, said "the glorious job done by doctors and nurses did more to make me proud of my profession than anything I've seen in a long time."

In the populous Omaha-Council Bluffs area more than 25,000 persons were evacuated from their homes; the water supply was threatened; and about 1,400 persons were housed in Red Cross shelters. Despite such emergencies, there were no serious accidents or illnesses. Existing contagion did not spread, and not a single serious case of gastrointestinal illness was reported.

The Pottawattamie County Medical Society at Council Bluffs suddenly found itself faced with a gigantic task as the raging Missouri poured its mud and debris at the city's doorstep. As the frightening days wore on, the job became bigger.

Dr. Barnes related in a letter to his friend Dr. Frank E. Wilson of the American Medical Association's Washington office that "the disaster job, medically speaking, was a bare-knuckle fight—all out—no holds barred. Almost four million sand bags filled and used; 23 miles of dykes raised six feet; 6,000 soldiers on police duty; big earth-moving equipment on the job everywhere; 25,000 men working around the clock under floodlights and through rain, snow and wind; all businesses closed except restaurants, hotels, groceries and prescription drug stores; 26 shelters set up, three of them isolation shelters; 96 nurses on duty in Council Bluffs alone; a physician on duty in each shelter."

James Cumiskey, Alexandria, Va., who headed the Red Cross disaster operations in Council Bluffs, said the cooperation among the doctors during the emergency was "excellent—in fact, the very best."

The medical profession set up its operation to aid the stricken area in the following manner. The American Red Cross, under the local leadership of Dr. Isaac Sternhill, handled medical aid for evacuees, staffed the shelter areas, and supervised the first-aid stations. The city health officer, Dr. George J. Klok, was in charge of the control and prevention of communicable disease, sanitation, immunization, and isolation.

When Council Bluffs was faced with real danger, the medical society met and laid plans for the dark days ahead. The physicians cancelled all but emergency operations in all hospitals—neglected their own interests and waded in mud during the harrowing nights to do all they could for the community.

At one time three typhoid vaccination centers were in operation. Dr. Klok estimated that 10,000 "shots" were given at the centers, physicians' offices, and at the shelters during a nine day period. School nurses, the Visiting Nurses' Association, and the city's dental profession all cooperated in what was called "Operation Inoculation." Physicians were alerted when the city's water intake plant near the river was flooded, and an auxiliary supply had to be put into operation. The Army brought in a 180,000-gallon water purification unit, but it was never used. The Iowa State Department of Health sent a public health officer and several engineers who, Dr. Klok said, "offered valuable counsel on public health measures." Much of their time was spent in inspecting shelters for both civilians and army personnel.

Physicians were on duty almost continuously at the shelters. Measles, mumps, and chickenpox cases were handled in the isolation centers. A total of 75 infants who required bottle feedings were housed in the shelters. Physicians arranged for the city's hospitals to prepare the formulas and deliver them regularly to the shelters, where they were kept under refrigeration.

A serious accident threat loomed along the levees as thousands of men set to work building a "flashboard" to hold back the rising water. Four first-aid stations were set up, with the supplies being furnished by the American Red Cross. Most of the first-aid personnel was recruited from Creighton University medical school. Students also served wherever needed at the city's hospitals.

FEDERAL MEDICAL LEGISLATION

Federal Hospitalization for the Aged

Senators Murray of Montana and Humphrey of Minnesota introduced S. 3001 proposing to amend the Federal Old Age and Survivors Insurance System (Social Security) to provide insured aged persons (over 65) and their dependents, and survivors of deceased insured persons, with insurance against the cost of hospitalization. The number of persons eligible according to a Federal Security Agency estimate is 7,100,000. This program has been publicly advocated by the Social Security Administration and Oscar Ewing, Administrator of the Federal Security Agency for the past year. The chief features of the bill follow.

Benefits.—Bed, board, nursing, laboratory, ambulance, operating room, and usual drugs and appliances when the patient is hospitalized. Surgery, domiciliary care, and hospitalization for tuberculosis and mental conditions are not included. The maximum hospitalization annually would be 60 days. The certification for benefits would be made by the individual's attending physician.

Control of program.—The Administrator of the Federal Security Agency would prescribe and promulgate rules and regulations for the conduct of the program. A state would merely act as the agent of the Administrator in carrying out details, functioning through its designated health agency. In the event a state refuses to accept the agency agreement, the FSA Administrator would operate the program within such state. The Federal Hospital Council, presently functioning under the Hill-Burton Act, would act as an advisory committee.

Role of private insurance plans.—States or the Federal Security Administrator may utilize "the services of private nonprofit organizations" in dealing with hospitals.

Cost of program.—The program would cost between 191 and 235 million dollars annually at the outset, according to FSA estimates. The basis is $15 per day hospital cost multiplied by approximately two days hospitalization annually per person, multiplied by 7,100,000 eligible persons. The program would be financed entirely by the federal government from the Social Security Trust Fund. No financial contribution would be required from states.

Representatives Dingell of Michigan, and Celler of New York, introduced H. R. 7484 and H. R. 7485 respectively. Both bills are identical with S. 3001 above.

Disability Insurance Benefits

Representative Bailey of West Virginia introduced H. R. 7460, which would amend title 2 of the Social Security Act to provide benefits for permanently and totally disabled workers

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The summary of federal legislation was prepared by the Washington Office of the American Medical Association and the summary of state legislation by the Bureau of Legal Medicine and Legislation.

who are covered by Social Security. This amendment is similar to one of the Social Security Amendments of 1950 (H. R. 6000 of the 81st Congress) opposed by the A. M. A. and which was dropped from the final version of the bill as enacted.

STATE MEDICAL LEGISLATION

Massachusetts

Bills Introduced.—H. 2328, proposes that the committee on Public Welfare make an investigation and study relative to **hospital expenses** in connection with the support of poor persons. S. 587, proposes the creation of an unpaid special commission to make an investigation and study of care and treatment of **tuberculosis.**

Michigan

Bills Enacted.—H. 172, has become Public Act No. 170 of the Acts of 1952. It authorizes cities, villages and townships and combinations thereof to form **hospital authorities** for the purpose of planning, promoting, acquiring, constructing, improving, enlarging, extending, owning, maintaining, and operating community hospitals within the area. S. 240, has become Public Act No. 137 of the Acts of 1951. It provides regulations for the licensing of trained, certified, **graduate professional nurses, practical nurses, and trained attendants.** S. 301, has become Public Act No. 172 of the Acts of 1952. It amends the medical practice act by, among other things, permitting the board to grant **temporary, annual licenses to practice to doctors of medicine** who are pursuing postgraduate study and who meet all qualifications and conditions for the practice of medicine except the making of the application and the taking of the examination required for a permanent license.

Mississippi

Bills Enacted.—H. 347, was approved April 12, 1952. It amends the law prohibiting the sale of **barbituric acid** without a doctor's prescription by providing that when a violation of the act is committed against a minor the person so convicted shall be sentenced to the penitentiary for a term of not less than one nor more than five years. H. 385, was approved April 9, 1952. It authorizes the necessary examinations of applicants for assistance to the blind to be made by either an **ophthalmologist or an optometrist.** H. 631, was approved April 12, 1952. It provides an appropriation for the purpose of defraying the expenses of a special program of eradication and control of **syphilis and other venereal diseases** by the state board of health. H. 744, was approved April 9, 1952. It provides an appropriation to the Mississippi Commission on Hospital Care for the purpose of building, erecting, and equipping **hospitals and other health facilities** within the state, including nursing homes, schools of nursing, health centers, health departments, clinics, and related facilities. H. 955, was approved April 11, 1952. It provides an appropriation for defraying the expenses of treating children afflicted with **cerebral palsy.** H. 972, was approved April 11, 1952. It provides an appropriation to the Board of Trustees of state institutions of higher learning for the purpose of providing necessary equipment, teaching staff, and personnel for general expenses of a **school of nursing** of the University of Mississippi. H. 981, was approved April 12, 1952. It provides an appropriation to the Board of Trustees of state institutions of higher learning for the purpose of paying for **scholarships for advanced studies in nursing.** S. 268, was approved April 11, 1952. It authorizes the trustees of higher institutions to provide **scholarships** in an amount not to exceed $100 annually **for student nurses** who will enter training in nursing in the state. S. 330, was approved April 15, 1952. It amends the law relating to medical scholarships by providing that the state medical education board shall have the power and authority to allow and permit a reasonable number of persons granted **scholarships** to practice **in any of the state's mental institutions** under the management of the Board of Trustees of such institutions and that such practice shall constitute practice in Mississippi for the purpose of the act. S. 642, was approved April 14, 1952. It provides an appropriation to the Board of Trustees of state institutions of higher learning for the purpose of paying for **scholarships for advanced studies** in nursing as provided by the act establishing the nursing scholarship program.

New Jersey

Bills Enacted.—A. 13, has become Ch. 102 of the Laws of 1952. It provides for the enactment of a prevention of chronic illness act which will establish a division of chronic illness control in the department of health for the prevention, early detection and control of **chronic illness and rehabilitation of the chronic sick.** A. 179, has become Ch. 78 of the Laws of 1952. It provides among other things, that no person shall disclose the name or address or identity of any person known or suspected of having a **venereal disease** except to the person's physician or to a health authority or, in the event of a constitution under the state's criminal law, to a prosecuting law officer or the court, provided that the person's physician or a health authority may disclose the name and address or identity of such person when and only when the physician or health authority shall deem such exclosure necessary to protect the health or welfare of the person or of his family or of the public. A. 540, has become Ch. 90 of the Laws of 1952. It amends the law relating to **narcotic drugs** by making it a high misdemeanor for any person to sell, give, or administer or dispense narcotic drugs to persons under the age of 18 years. A. 561, has become Ch. 95 of the Laws of 1952. It amends the law relating to **narcotic drugs** by providing that any person who induces or persuades any other person to use any narcotic drug unlawfully or aids or contributes to the addiction of any other person shall be guilty of a high misdemeanor. S. 61, has become Ch. 12 of the Laws of 1952. It provides a method for granting disability, death and **medical and hospital benefits** for civil defense volunteers who suffer injury as a result of participation in civil defense activities.

Rhode Island

Bill Introduced.—H. 1005, proposes a resolution that the Senators and Representatives from Rhode Island in the Congress of the United States be earnestly requested to use every effort to have passd the proposd **Murray-Dingell Bill.**

Bills Enacted.—H. 797, was approved Aprid 23, 1952. It directs the Rhode Island Development Council to conduct a survey of the functions and needs of the **state mental health program** to determine the physical facilities needed in the future to carry on such a program and to prepare a general guide plan for development and improvement of the physical facilities of the state welfare institutions. S. 132, was approved April 24, 1952. It provides regulations for the **licensing of professional and practical nursing.**

PHYSICIANS AND SCHOOLS REPORT PRINTED

The Bureau of Health Education announces the publication of the Report of the Third National Conference on Physicians and Schools. This conference was held at Highland Park, Ill., in November, 1951, and was attended by physicians, educators, and public health personnel, particularly the official representatives of state and territorial medical associations, health departments, and education departments. Complimentary copies have been sent to the presidents and secretaries of all state medical associations, the executive officers of all state health and education departments, and those who attended the conference.

It is suggested that medical societies, both state and local, purchase copies of this report for their officers and the committee concerned with the school health program. Quantity prices will be submitted on request by the Order Department of the American Medical Association.

This 72-page pamphlet reports the deliberations of the five discussion groups that considered health appraisal of school children, emergency services for accidents and sudden illness, health services in physical education, including athletics, follow-up to meet child health needs, and new concepts in control of communicable diseases.

SECRETARIES NAMED FOR MEDICAL EDUCATION AND STUDENT GROUPS

Division of executive secretarial duties of two groups of the American Medical Association—the American Medical Education Foundation and the Student A. M. A.—has been announced by the executive committee of the Association's Board of Trustees. Activities of both groups have expanded to such an extent that one secretary no longer can serve both groups, it was stated.

Russell F. Staudacher, Park Forest, Ill., who has been serving as secretary for both groups during the past year, will devote full time as executive secretary of the Student A. M. A. and as executive editor of its publication, the *Journal of the Student American Medical Association.*

Hiram W. Jones, Elmhurst, Ill., has been appointed executive secretary of the American Medical Education Foundation. He formerly was associated with the Research Council for Economic Security, Chicago, was director of finance for the Chicago region of the National Conference of Christians and Jews, and was director of fund raising for Community Relations Consultants, Inc., specializing in hospital fund raising.

QUARTERLY CUMULATIVE INDEX MEDICUS

Volume 48 of the Quarterly Cumulative Index Medicus, covering the literature for the last half of 1950, was mailed to subscribers in March and is now available for purchase from the Order Department of the American Medical Association. Volume 49 (January-June, 1951) is in press, but it will not be ready for distribution for several months.

MEDICAL NEWS

CALIFORNIA

Dr. Lisser Honored.—A dinner honoring Dr. Hans Lisser was given on April 12 at the Bohemian Club in San Francisco. The occasion was his 64th birthday and also the publication of the April, 1952, edition of *Postgraduate Medicine*, which was dedicated to the endocrine clinic of the University of California Medical School, of which he is the chief. The issue contains a collection of papers on adrenal tumors by various authors from the university.

Symposium on Hypnosis.—The University of California Extension, Los Angeles, will conduct a symposium on hypnosis for graduates of approved medical and dental schools, for psychologists, psychiatrists, and sociologists, and for graduate students in psychology, psychiatry, and social welfare, June 25-27. Sessions will be held in the chemistry building on the Los Angeles campus of the university from 9 a. m. to 5 p. m. The present status of hypnosis will be evaluated. Applications should be sent to Dr. Thomas H. Sternberg, Medical Extension, University of California, Los Angeles 24. The fee for the course is $50, with a reduced fee of $25 for students now working toward graduate degrees in psychology or psychiatry.

Quarantine on Mussels.—California's yearly quarantine on mussels, which went into effect May 1, prohibits gathering of the shellfish for any use but fish bait until next Oct. 31. Dr. Wilton L. Halverson, state director of public health, warned that "one bite of a mussel can be fatal during the summer, due to the deadly poison produced in these edible shellfish by certain foods they eat at this time of year." Clams are subject to summer poisoning to a lesser degree. White meat of clams is safe if it is thoroughly cleaned and washed, but all dark parts should be discarded. When sold for fish bait during the quarantine period, mussels must be broken open, and any container from which they are sold must be prominently labeled: "For Fish Bait Only—Unfit for Human Consumption."

FLORIDA

Society News.—At the recent annual meeting of the Gulf Coast Clinical Society in Pensacola, Dr. Alvin L. Stebbins of Pensacola was elected president, and Dr. Dale E. York of Pensacola, secretary-treasurer.

Meeting of Naval Officers and County Society.—The Monroe County Medical Society and the Naval Medical Officers, Key West Area, held a joint meeting of the U. S. Naval Hospital, Key West, on March 20. Dr. Joseph L. Fetterman, former assistant clinical professor for mental diseases, Western Reserve University School of Medicine, Cleveland, spoke on "How to Deal with Depressions."

GEORGIA

Laboratory Diagnosis of Tuberculosis.—In cooperation with the Division of Chronic Disease and Tuberculosis, U. S. Public Health Service, the bacteriology laboratories of the Communicable Disease Center, Chamblee, will offer two courses in the laboratory diagnosis of tuberculosis on the following dates: May 19-23 and Nov. 3-7. Practical laboratory training in preparation of culture mediums, microscopy, cultural procedures, diagnostic use of animals, and testing of drug sensitivity will be included. No tuition or laboratory fees will be charged. Information may be obtained from the Officer in Charge, Laboratory Training Services, Communicable Disease Center, U. S. Public Health Service, P. O. Box 185, Chamblee.

Physicians are invited to send to this department items of news of general interest, for example, those relating to society activities, new hospitals, education and public health. Programs should be received at least three weeks before the date of meeting.

ILLINOIS

Personal.—Dr. Louis B. Newman, chief, physical medicine and rehabilitation service at Veterans Administration Hospital, Hines, held clinics and addressed the staff of the Veterans Administration Hospital and the faculty of the University of Arkansas School of Medicine at Little Rock, Ark., on April 28. His lecture-demonstration was on "Physical Medicine and Rehabilitation of Patients with Spinal Cord Injuries."

Secretaries' Conference.—A dinner meeting, open to all members of the Illinois State Medical Society, will be held Tuesday evening, May 13, at 6 p. m. in the Crystal Room of the Hotel Sherman, Chicago. Participating in a panel on public relations will be Mr. Leo Brown, director of public relations, American Medical Association; Dr. Warren W. Furey, past president of the Chicago Medical Society; and Dr. Robert E. Heerens of Rockford, chairman of the public relations committee of Winnebago County Medical Society. Dr. Percy E. Hopkins of Chicago will serve as moderator.

Chicago

Film Award.—A motion picture film by Drs. Paul C. Holinger and Kenneth C. Johnston, Chicago, entitled "The Endoscopic Appearance of Diseases of the Trachea," has been awarded the American College of Surgeons' Certificate of Merit as the best teaching film reviewed by its committee in 1951.

Grants for Research.—Three Chicago area firms have awarded grants to the University of Illinois College of Medicine to support research. The Wander Company has renewed a grant in the amount of $2,000 for research on nutrition that is being conducted by Dr. Kwang S. Kim. Abbott Laboratories has made a $1,600 grant in partial support of a study of connective tissue in allergy that is being directed by Dr. Max Samter. Armour and Company has added $900 to a previous grant to Dr. Louis R. Limarzi for an investigation of blood diseases.

Personals.—Dr. Derrick T. Vail left at the end of March for Dublin, Ireland, where he presented the annual Montgomery Lecture of the Royal College of Surgeons of Ireland on April 17. The Ophthalmological Society of the United Kingdom held its annual meeting at the same time and place.——Dr. Clark W. Finnerud was made an honorary member of the Minnesota Dermatological Society on Feb. 15. Recently he was elected a corresponding member of the Societas Dermatologica Svecica (Sweden) and the Societas Dermatologica Austriaca (Austria).——Dr. Hiram T. Langston, who will head the department of surgery at the new Chicago State Tuberculosis Sanitarium, presently under construction, has joined the staff of the University of Illinois College of Medicine as clinical associate professor of surgery. He will also serve as a consultant in thoracic surgery at Veterans Administration Hospital, Hines, Ill.——Dr. Harry R. Hoffman, director of the mental hygiene section of the city health department, has resigned to return to private practice as a neuropsychiatrist. He has been succeeded by Dr. Irene C. Sherman, who was his assistant.——Dr. Maurice H. Cottle recently gave a course on "Reconstructive Surgery of the Nasal Septum" at the Hartford (Conn.) Hospital.——Dr. Abraham Levinson addressed the College of Physicians of Philadelphia March 27 on "The History of Pediatric Neurology and Psychiatry."——Dr. Samuel J. Taub, chairman, department of allergic diseases, Chicago Medical School, lectured recently on "The Role of Allergy in General Practice and Surgery" at the annual meeting of the Lackawanna County Medical Society in Carbondale, Pa.

IOWA

Narcotic Violation.—Drs. Bernice E. Brown and Gerald Franklin Brown, Iowa City, pleaded guilty to a violation of the Iowa uniform narcotic drug law and on Jan. 21 were fined $1,000 each.

Speech Clinic.—The University of Iowa will give a six week speech clinic for about 50 to 60 children as part of its summer training and research program. The clinic operates as a residential program from June 23 to Aug. 1, serving boys and girls from 7 to 16 in housing units operated by the clinic. Those interested in positions on the clinic or dormitory staff should write to Frederic L. Darley, Ph.D., Speech Clinic, University of Iowa, Iowa City.

MARYLAND

New Film Available.—"Frontiers in Medical Research," a new film in sound and color, prepared by the Maryland Society for Medical Research, is available for exhibition purposes. The film shows activities in the various research laboratories throughout Baltimore, with special emphasis on the types of animals used and the procedures employed. Loan of the film may be arranged by writing to the society, 522 W. Lombard St., Baltimore 1.

MASSACHUSETTS

Personals.—Dr. Henry K. Beecher, Boston, was recently made an honorary member of the Royal Society of Medicine, London. ——Dr. Chester North Frazier, professor of dermatology at Harvard University, has succeeded Dr. William LeRoy Fleming as president of the Massachusetts Society for Social Hygiene. Dr. Fleming recently resigned as chief of the genitoinfectious disease clinic at the Massachusetts Memorial Hospitals to become professor of preventive medicine at the University of North Carolina Medical School.——Dr. Roy F. Feemster, Boston, director, division of communicable diseases, Massachusetts Department of Public Health, has departed for Pakistan as one of a team of experts loaned to Pakistan under the Point Four program of the Department of State. Other members of the party include experts in industry, agriculture, and education.

Harvard Alumni Day.—Dr. John W. Cline, Harvard '25, President of the American Medical Association, will speak in amphitheatre E, Harvard Medical School at noon, May 28. After luncheon the Alumni Day Symposium will be presented by the following collaborators:

Mark D. Altschule, Belmont, Relations Between Endocrinology and Psychiatry from 1682 A. D. to the Present Day.
Walter Bauer, Boston, Modern Medical Triology.
Reginald Fitz, Boston, How to Get Your Sons into Harvard Medical School.
Dwight E. Harken, Boston, Abuse of the Surgeon by Physicians Whose Patients Have Mitral Stenosis.
A. Baird Hastings, Ph.D., Boston, Biological Adventures with Isotopes.
Arthur T. Hertig, Boston, Pathologist's Retreat into Embryonic State.
Eugene M. Landis, Boston, Human Element in First Year Physiology.
S. Burt Wolbach, Boston, Glorious Past and Uncertain Future of Pathology.

MICHIGAN

Personal.—Dr. Carl C. Coolbaugh, instructor of anatomy at Wayne University College of Medicine, Detroit, has been awarded a national research fellowship by the Arthritis and Rheumatism Foundation for a year's investigation into the causes of arthritis.

Alumni Reunion.—The Children's Hospital of Michigan in Detroit will hold its annual clinic day and alumni reunion on May 14. Out-of-state speakers will include:

Charles N. Pease, Chicago, Avascular Necrosis of Bone in Children.
S. Alexander Nadas, Boston, Primary Myocardial Disease in Infants and Children.
Martin H. Wittenborg, Boston, Congenital Heart Disease and the Radiologist.
Luther A. Longino, Boston, Congenital Heart Disease and the Surgeon.

MISSISSIPPI

Mississippi Honors Its Physicians.—Mississippi's 1,500 physicians were honored on March 30 when the state observed "Doctor's Appreciation Day." The occasion was set aside in a gubernatorial proclamation by Gov. Hugh L. White, who enjoined statewide observance in appreciation of the physicians' personal dedication to service.

State Medical Meeting in Jackson.—The annual meeting of the Mississippi State Medical Association will be held at the Hotel Robert E. Lee in Jackson May 13-15, under the presidency of Dr. James G. Thompson of Jackson. Out-of-state speakers include:

Charles A. Jones, New Orleans, Use of ACTH and Cortisone.
A. Neal Owens, New Orleans, Rehabilitation of Crippled Children.
Clifford G. Grulee Jr., New Orleans, Colic in Infancy.
Alvyn W. White, Pensacola, Fla., Bleeding from the Gastrointestinal Tract in Pediatrics.
Paul S. Williamson, Memphis, Training for General Practice.
Hugh R. Williams, Atlanta, Epidemiology and Control of Infectious Hepatitis.
Philip M. Lewis, Memphis, External Diseases of the Eye.
Mercer G. Lynch, New Orleans, Laryngofissure.

The Woman's Auxiliary will meet May 13-14 at the Hotel Heidelberg in Jackson.

MISSOURI

Personal.—The American Speech and Hearing Association has awarded the honors of the association for distinguished contribution to the field of speech and hearing to Dr. Hallowell Davis of St. Louis.

Medical Alumni Meeting.—The annual reunion of the medical alumni of St. Mary's Group of Hospitals (St. Louis University) will be held at St. Mary's Hospital, 6420 Clayton Road, St. Louis, May 15, under the presidency of Dr. Harry K. Purcell of St. Louis. The morning sessions will begin at 8:30 with a medical surgical conference, followed by case presentations and a genitourinary conference. The afternoon program by staff members of the St. Louis University School of Medicine will include:

Problems of Behavior in Children, Dr. Peter G. Danis, professor of pediatrics and chairman of the department.
Rehabilitation in the Home, Dr. D. Elliott O'Reilly, instructor in orthopedic surgery.
Uses and Misuses of Intravenous Pyelography, Dr. James M. Macnish, assistant professor of clinical urology.
St. Louis Maternal Mortality Survey—1951, Dr. Roy V. Boedeker, senior instructor in gynecology and obstetrics.
Common Rectal Lesions, Dr. Francis J. Burns, instructor in surgery and assistant director of resident staff in surgery.

NEW YORK

Society News.—The Nassau Radiological Society, Baldwin, was organized Jan. 29. Dr. Percival A. Robin, Hempstead, was elected president; Dr. Joseph J. La Vine, Baldwin, secretary, and Dr. David L. Jellinger, Patchogue, treasurer.

Living in Cellars Is Illegal.—Because the illegal use of cellars as living quarters is increasing steadily in Manhattan and some sections of Brooklyn and the Bronx, Dr. John F. Mahoney, commissioner of the City of New York Department of Health, announces that the department will join with other city agencies to halt the growth of the practice and to help families now living in cellars to get other quarters. Letters are being sent to 40,000 property owners and landlords of 60,000 buildings in Manhattan warning them that the use of cellars for sleeping or residence purposes is a violation of the Sanitary Code, punishable, on conviction, by a fine not exceeding $500, or imprisonment up to one year, or both.

New York City

Tumor Conference.—The Harlem Hospital Tumor Conference will be held May 21 at 10:45 a. m. in the main floor conference room of the women's pavilion. Dr. Isidore Snapper, director of medical education, Mount Sinai Hospital, will speak on "Multiple Myeloma."

Harvey Lecture.—Laszlo Zechmeister, professor of organic chemistry, California Institute of Technology, Pasadena, will deliver the ninth Harvey Lecture of the current series at the New York Academy of Medicine on May 15 on "Biochemical Studies Based on Chromatographic Methods."

Dr. Gellhorn to Head Cancer Research Institute.—Dr. Alfred Gellhorn, associate professor of clinical cancer research at the College of Physicians and Surgeons, Columbia University, has been appointed director of the university's Institute of Cancer Research, succeeding Dr. Cushman D. Haagensen.

OHIO

Personal.—Members of the local section of the American Chemical Society honored Dr. Martin H. Fischer, University of Cincinnati physiologist, at their annual Eminent Chemist Night April 9, awarding him an inscribed scroll. Dr. Fischer discussed "Colloids in Industry and Medicine."

Courses in Speech and Hearing.—Western Reserve University offers a summer session in speech and hearing at the Cleveland Hearing and Speech Center. Professor Albert Douglas of the University of Texas and Texas State School for the Deaf will be among the guest lecturers. An institute on voice pathology will be featured during the second session. The first six week session begins June 16 and the second July 28. For information write Director of Admissions, Western Reserve University, Cleveland 6.

State Medical Meeting in Cleveland.—The Ohio State Medical Association will hold its annual meeting at the Cleveland Public Auditorium May 20-22, under the presidency of Dr. Fred W. Dixon of Cleveland. Dr. John W. Cline of San Francisco, President of the American Medical Association, and Mr. Leo Brown of Chicago, director of the Association's department of public relations, will discuss "You and Your AMA." Other guest speakers will include:

Robert L. Flett, Derby, England, Success and Failure of the Portmann Operation.
Albert D. Ruedemann, Detroit, End Results of Muscle Surgery.
Joseph H. Kiefer, Chicago, Undescended Testis: Types and Management.
William M. Wallace, Boston, Management of Childhood Diabetes.

PENNSYLVANIA

Dr. Weidman Honored.—The *Journal of Investigative Dermatology* dedicates a "festschrift" number, the March issue, to Dr. Frederick D. Weidman, emeritus professor of research in dermatology and mycology, University of Pennsylvania School of Medicine, Philadelphia. The editors describe Dr. Weidman as "the first American scientist to have devoted himself solely to basic laboratory research and teaching oriented toward the problems of disease of the skin."

Philadelphia

Personal.—Dr. Truman G. Schnabel Jr. has been appointed a scholar in medical science by the John and Mary R. Markle Foundation of New York. The appointment is accompanied by a grant of $30,000 to the Medical School of the University of Pennsylvania toward the support of Dr. Schnabel as a teacher and research worker during the next five years.

Exhibit of Medical Prints.—A new collection of medical art by the masters, from Rembrandt and Goya to Daumier and Toulouse-Lautrec, has been assembled by the Philadelphia Museum of Art through the support of Smith, Kline & French Laboratories. The 85 prints, titled "Ars Medica," will remain on exhibition at the museum through May 25. The exhibit includes famous and rare pieces of graphic art on medical subjects from sources in this country and abroad. The earliest piece of art in the collection is a silver drachma from the island of Cos, of about 150 B. C., portraying a head of Asklepios, the Greek god of medicine. The exhibit is divided into 15 sections, whose titles reveal the broad panorama of medicine covered.

SOUTH CAROLINA

Annual State Medical Meeting.—The annual meeting of the South Carolina Medical Association will be held at the Ocean Forest Hotel, Myrtle Beach, May 13-15, under the presidency of Dr. Joseph D. Guess of Greenville. Dr. Loudon C. Reid, associate professor of physiology, New York University School of Medicine, and professor of experimental surgery in the Postgraduate Medical School of New York University, will be the guest speaker. On Wednesday afternoon he will present a paper on "Mechanisms of Acid Base Balance of Clinical Significance," and at the Thursday afternoon session his topic will be "The Role of the Kidney in Sodium and Potassium Excretion and Water Balance."

WISCONSIN

Clinics at Appleton and Janesville.—The Council on Scientific Work of the State Medical Society of Wisconsin in cooperation with the State Board of Health, the Wisconsin Division of the American Cancer Society, Wisconsin Anti-Tuberculosis Association, the Wisconsin Heart Association, the Wisconsin chapters of the National Foundation for Infantile Paralysis, the Wisconsin Academy of General Practice, and the University of Wisconsin Medical School and Marquette University School of Medicine will hold clinics May 13 at the Monterey Hotel, Janesville, May 14 in Stevens Point, and May 15 at the Elks Club, Appleton. The speakers are as follows:

M. Edward Davis, Chicago, Responsibilities of the Obstetrician in the Problem of Prematurity.
Walter Zeit, Ph.D., Milwaukee, Fractures of Upper and Lower Extremities.
Bruce J. Brewer, Milwaukee, Trends in Therapy of Extremity Fractures.
John W. Towey, Powers, Mich., Advances in Treatment of Tuberculosis.

Clinics will be held on May 20 at the Racine Country Club, Racine, May 21 at the Riverview Country Club, Menominee, Mich., and on May 22 at the Foeste Hotel, Sheboygan. Speakers at these clinics and their first presentations include:

O. Sidney Orth, Madison, Pharmacologic Action of Cardiac Drugs.
Ovid O. Meyer, Madison, Therapeutic Use of Cardiac Drugs.
Edmund B. Flink, Minneapolis, Diagnosis and Treatment of Hyperthyroidism.
Walter J. Reich, Chicago, Common Gynecologic Surgical Procedures.

The fee for the spring clinic only is $6; for spring clinic and two hospital conferences, $10.

GENERAL

Allergists' Election.—At the annual Congress of the American College of Allergists in Pittsburgh, April 7-9, Dr. J. Warrick Thomas of Richmond, Va., was named president; Dr. M. Murray Peshkin, New York, president-elect; and Dr. Frederick W. Wittich, Minneapolis, secretary-treasurer.

Joint Neurological Meeting.—The annual meeting of the American Neurological Association was held as a joint meeting with neurologists from South America on May 8-10 in Atlantic City, N. J., under the presidency of Dr. S. Bernard Wortis of New York. There were 64 presentations (9 with motion pictures), 9 papers were read by title, and 2 demonstrations were given.

Meeting on Medical History.—The American Association of the History of Medicine held its annual meeting at the University of Kansas School of Medicine in Kansas City and Lawrence, Kan., May 1-3, under the presidency of Dr. Ralph H. Major. The Fielding H. Garrison Lecture, "Growth of Medicine and the Letter of the Law," was delivered by Dr. Benjamin Spector of Boston.

Name Medical Director of American Heart Association.—Dr. Charles D. Marple, assistant clinical professor of medicine, University of California School of Medicine, San Francisco, has been appointed medical director of the American Heart Association. Dr. Marple will administer the research policies and scientific program of the association as developed by its scientific council and will direct the program of physician education.

Biological Psychiatry Meeting.—The Society of Biological Psychiatry will hold its annual convention at the Hotel Claridge, Atlantic City, N. J., May 11. Presentations by individual authors will include:

James W. Papez, Columbus, Ohio, Forms of Living Organisms in Nerve Cells in Psychotic Patients.
John D. Campbell, Atlanta, Manic-Depressive Psychosis in Children.
Roland P. Mackay, Chicago, Reflections on Memory.
Nick D. Ischlondsky, New York, Role of Cortex in Consciousness as Learned from Conditioned-Reflex Studies.
Ladislas J. Meduna, Chicago, Mode of Action of CO_2 Treatment in Human Neuroses.
Charles M. Pomerat, Ph.D., Galveston, Texas, Further Observations on Nerve Tissue in Vitro.

Tuberculosis Meetings.—The National Tuberculosis Association, American Trudeau Society, and the National Conference of Tuberculosis Workers will hold joint annual meetings in Boston at the Statler and Sheraton Plaza hotels May 26-29. The medical sessions will include panel discussions on "Bacteriology

of Tuberculosis," "Relationship of ACTH and Cortisone to Pulmonary Disease," "Pulmonary Suppuration," "Chemotherapy in Tuberculosis," and "Excision Therapy in Tuberculosis." There will be seminars on "Mechanical Treatment of Acute and Chronic Underventilation of the Lungs," "Host Resistance in Tuberculosis," "Relapse in Pulmonary Tuberculosis as Related to Treatment," and "Sarcoidosis." A special evening session May 26 will be devoted to "Isonicotinic Acid Derivatives in Tuberculosis Treatment."

Otological Society Meeting.—The American Otological Society, Inc., will hold its annual meeting at the Royal York Hotel, Toronto, Canada, May 18-19, under the presidency of Dr. Gordon D. Hoople of Syracuse, N. Y. Single presentations will be made by the following:

Albert C. Furstenberg, Ann Arbor, Mich., Anatomical Considerations of Vertigo.
C. Stewart Nash, Rochester, N. Y., Noise in Industry—Medicolegal Implications.
D. E. Staunton Wishart, Toronto, Canada, Problem of Hearing Defects in Children.
Victor Goodhill, Los Angeles, Tinnitus Identification Test.
George E. Shambaugh Jr., Chicago, Developmental Anomalies of Sound Conducting Apparatus and Their Surgical Correction.

Meeting on Mental Deficiency.—The annual meeting of the American Association on Mental Deficiency will be held at the Hotel Bellevue-Stratford, Philadelphia, May 27-31 under the presidency of Dr. Edward J. Engberg of Faribault, Minn. Papers to be presented at the section meeting on medicine and psychiatry on Tuesday include:

Susan A. Slakis, Lincoln, Ill., Study of Digestive Process and Food Assimilation in Spastic Children with Malnutrition.
George Tarjan and Foley Benson, Pacific Colony, Spadra, Calif., Report on Pilot Study at Pacific Colony.
George Tarjan and Katherine Sharfman, Pacific Colony, Spadra, Calif., Two Years Experience with General Purpose Mental Hygiene Clinic in Hospital for Mental Defectives.
Philipp Schwartz, Wrentham, Mass., Pathogenesis of Status Marmoratus.
Catherine DeEtte Edgett, Laurelton, Pa., (Ethel N. Hartzler, Sunbury, Pa., author), Ten-Year Survey of Girls Discharged from Laurelton State Village.

On Thursday the meeting will be held in the Music Hall at the Elwyn (Pa.) Training School, where Dr. Elmer C. Jackson will discuss "Types of Mental Deficiency: Their Diagnosis and Treatment."

American Laryngological, Rhinological, and Otological Society.—This society will hold its annual meeting May 20-22 at the Royal York Hotel, Toronto, Canada, under the presidency of Dr. C. Stewart Nash of Rochester, N. Y. Dr. DeForest C. Jarvis of Barre, Vt., will be guest of honor. Dr. Scott Stevenson, London, England, will speak on "Socialized Medicine in England." There will be a symposium on "Relationship of Bronchoscopy to Chest Surgery," with Dr. Frederick G. Kergin of the University of Toronto and Drs. Chevalier L. Jackson of Philadelphia and Edwin N. Broyles of Baltimore as collaborators. Participating in a symposium on "Surgical Treatment of Hydrops of the Labyrinth" will be Drs. Kenneth M. Day of Pittsburgh, Robert L. Fleet of Derby, England, Kenneth G. McKenzie of the University of Toronto, and Percy E. Ireland and Hugh O. Barber of Toronto, Canada. Three motion pictures will be shown: "Pathology of the Nasopharynx" (Drs. Barney M. Kully and Henry J. Rubin, Los Angeles, by invitation); "Surgical Correction of Congenital Ear Canal Atresia with Restoration of Practical Hearing" (Dr. Howard P. House, Los Angeles), and "Adult Tonsillectomies Using Pentothal Sodium, Curare, Pontocaine, and Novocaine as the Anesthetic" (Dr. Fordyce Johnson, Pasadena, Calif.).

Estimated Annual Toll of Rabies.—In a recent address before the Minnesota Veterinary Society in Minneapolis, James H. Steele, M.P.H., of the U. S. Public Health Service said that conservative estimates of the annual rabies toll in the United States include 500,000 persons exposed to dog-bite, 40,000 of whom must take the Pasteur antirabies treatment; about 40 human deaths; 12,000 dog and 1,000 cattle fatalities; $1,000,000 loss in domestic animals; $5,000,000 medical and public health expense for such items as Pasteur treatments and laboratory services; immeasurable loss in wages, human suffering, and anxiety.

Dr. Steele pointed out that the control of rabies requires the cooperation of the general public as well as the efforts of official agencies and professional groups. Effective rabies control means more than establishment of vaccination clinics and stray dog control. It means, he said, that the lay public must be stimulated to do something about rabies. No rabies program can be successful, however, unless there is good dog control, the speaker said. That canine rabies can be controlled has been demonstrated in a number of cities and rural areas. One of the latest technical developments is the chick-embryo vaccine, which has been proved safe and effective in protecting dogs against rabies.

Community agencies and persons can get rabies pamphlets, posters, and other literature from the Communicable Disease Center, Atlanta, Ga.; Health Publications Institute, Raleigh, N. C.; Metropolitan Life Insurance Company, New York; and the American Veterinary Medical Association, Chicago.

CANADA

Summer School.—The Vancouver Medical Association will conduct a summer school May 26-30 at the Hotel Vancouver. Dr. MacDonald Critchley, dean of the Institute of Neurology, The National Hospital, London, will lecture on "The Body Image" and "Huntington's Chorea." Dr. Leland G. Hunnicutt of Pasadena, Calif., will speak on "The Chronically Congested Ear," "Control of Hemorrhage in Ear, Nose, and Throat," "When to Advise Ear, Nose, and Throat Operations," and "Improved Techniques in Tonsillectomy." Dr. R. Gordon Douglas, obstetrician and gynecologist-in-chief of the New York Hospital, will give five lectures, with titles to be announced. Dr. John F. McCreary, head of the department of pediatrics, University of British Columbia, will give four pediatric lectures, and Dr. William Boyd, professor of pathology, University of British Columbia, will discuss "Industrial Cancer." Information may be obtained from Dr. John A. Irving, Secretary, Summer School Committee, 1807 W. 10th Ave., Vancouver 9, B. C.

FOREIGN

WHO Consultants Arrive in Philippines.—Consultants of the World Health Organization have arrived in Manila to give advice in the yaws-control project and BCG antituberculosis vaccination campaign being conducted by the Philippine government with the assistance of WHO and the United Nations International Children's Emergency Fund. The consultant for the yaws program is Dr. C. M. Hasselman, director of the skin clinic at Erlangen University, Germany, formerly WHO's chief medical adviser in the Indonesian government's antiyaws campaign. The consultant for the antituberculosis program is Dr. Anton Geser of Denmark. He has served for nearly four years in similar BCG campaigns in Germany, Poland, Palestine, Syria, and Egypt and most recently was chief of a BCG mission in Ceylon.

Cerebrospinal Meningitis in Africa.—According to the World Health Organization's Regional Office for the Eastern Mediterranean, Alexandria, cerebrospinal meningitis is the most widespread epidemic disease in Africa, responsible in the past 10 years for perhaps 500,000 cases and thousands of deaths. In the Sudan the incidence increased from 6,000 cases in 1950 to 57,000 in 1951 and shows no signs of abating. This increase may be more apparent than real, according to Dr. Wasfy Omar, chief of the Regional Epidemiological Intelligence Service, since "knowledge of the miraculous cures that have been achieved with sulfa drugs has spread into every hella, or collection of mud huts, in the country, and cases that previously would never have been declared are now brought on improvised stretchers by forced marches to quarantine units for treatment."

The WHO office added that treatment however has not been sufficient to stop the great waves of the epidemic, which usually begin in October and continue as long as the hot, dry weather lasts, stopping abruptly at the onset of the rainy season in June. Egypt, the Sudan, Ethiopia, and West, East, and Central Africa have been affected. Native populations are particularly sus-

ceptible, since many do not wear clothes and whole families huddle together in their small huts to keep warm in winter. The almost universal existence of carriers gives an epidemic of cerebrospinal meningitis a special form. An epidemic may break out when the so-called "carrier rate" goes over 50%.

The WHO team proposed new control measures involving the control of a whole community where the disease has appeared and an attempt to reduce the carrier rate below the danger line by injecting the whole population with procaine penicillin in oil. This was done in two villages. Other villages were treated in a similar manner with sulfonamide drugs in various forms, and neighboring villages were used for control purposes. Results of these experiments are now awaited.

Dr. William E. Clark of the U. S. Public Health Service is on loan to the World Health Organization for a study of the epidemiology of the cerebrospinal meningitis epidemic in the Sudan.

CORRECTION

Employment of Bus Operators with Myocardial Damage.—The author of the letter by this title in THE JOURNAL, April 5, 1952, page 1243, Dr. O. P. J. Falk, requests publication of the following addendum:

I do not believe that this suggested policy of rehabilitation is applicable to drivers of long distance inter-city lines or to railroad engineers, either of which are responsible for maintaining a high rate of speed for relatively long distances.

EXAMINATIONS AND LICENSURE

BOARDS OF MEDICAL EXAMINERS

ALABAMA: *Examination.* Montgomery, June 24-26, 1952. Sec., Dr. D. G. Gill, 537 Dexter Ave., Montgomery 4.

ALASKA:* *Examination.* Juneau. On application in other towns where there are board members. *Reciprocity.* On application. Sec., Dr. W. M. Whitehead, Box 140, Juneau.

ARKANSAS:* *Examination. Regular.* Little Rock, June 5-6. Sec., Dr. Joe Verser, Harrisburg. *Homeopathic.* Little Rock, June 10-11. Sec., Dr. Carl S. Bungart, 105 N. 14th St., Fort Smith. *Eclectic.* Little Rock, June 5-6. Sec., Dr. Frank C. Smith, 2301 Broadway, Little Rock.

CALIFORNIA: *Written.* San Francisco, June 23-26; Los Angeles, Aug. 18-21; Sacramento, Oct. 20-23. Application must be received at least two weeks prior to date of examination. *Oral for Reciprocity Applicants.* San Francisco, June 21; Los Angeles, Aug. 16; San Francisco, Nov. 8. Applicants are requested not to arrange to come to an oral examination until they receive notice from the Credentials Committee. *Oral and Clinical for Foreign Medical School Graduates.* San Francisco, June 22; Los Angeles, Aug. 17; San Francisco, Nov. 9. Sec., Dr. Frederick N. Scatena, 1020 N St., Sacramento.

COLORADO:* *Examination.* Denver, June 10-12. Final date for filing application is May 12. Sec., Dr. Samuel H. Brown, 831 Republic Bldg., Denver.

DELAWARE: Dover, July 8-10. Sec., Dr. Joseph S. McDaniel, 229 South State St., Dover.

FLORIDA:* *Examination.* Jacksonville, June 29-July 1. Sec., Dr. Homer L. Pearson, 701 Dupont Bldg., Miami.

GEORGIA: Atlanta and Augusta, June. Sec., Mr. R. C. Coleman, 111 State Capital, Atlanta 3.

GUAM: The Commission on Licensure will meet whenever a candidate appears or submits his credentials. Ex. Sec., Dr. Austin W. Matthis, Agana.

HAWAII: *Examination.* Honolulu, July 14-17. Sec., Dr. I. L. Tilden, 1020 Kapiolani St., Honolulu.

IDAHO: Boise, July 14-16. Sec., Mr. Armand L. Bird, 305 Sun Bldg., Boise.

ILLINOIS: *Examination.* Chicago, June 24-26 and Oct. 7-9. Supt. of Regis., Mr. Charles F. Kervin, Capitol Bldg., Springfield.

INDIANA: Indianapolis, June 1952. Sec., Dr. Paul R. Tindall, 1138 K of P Bldg., Indianapolis 4.

IOWA:* *Examination.* Iowa City, June 9-11. Sec., Dr. M. A. Royal, 506 Fleming Bldg., Des Moines.

KANSAS: Kansas City, June 4-5. Sec., Dr. O. W. Davidson, 864 New Brotherhood Bldg., Kansas City.

KENTUCKY: *Examination.* Louisville, June 3-5. Sec., Dr. Bruce Underwood, 620 S. Third St., Louisville.

MARYLAND: *Examination.* Baltimore, June 17-20. Sec., Dr. Lewis P. Gundry, 1215 Cathedral St., Baltimore. *Homeopathic.* Baltimore, June 17-18. Sec., Dr. John A. Evans, 6029 Bellona Ave., Baltimore.

MICHIGAN:* *Examination.* June. Sec., Dr. J. E. McIntyre, 100 W. Allegan St., Lansing 8.

MISSOURI: *Examination.* St. Louis, May 28-29 and June 13-14. *Reciprocity.* May 27. Ex. Sec., Mr. John A. Hailey, Box 4, State Capitol Bldg., Jefferson City.

NEBRASKA: *Examination.* Omaha, June 16-18. Director, Mr. Husted K. Watson, Bureau of Examining Boards, Room 1009, State Capitol, Lincoln.

NEW JERSEY: *Examination.* Trenton, June 17-20. Sec., Dr. E. S. Hallinger, 28 W. State St., Trenton.

NORTH CAROLINA: *Written.* Raleigh, June 16-19; *Reciprocity.* Raleigh, June 17. Sec., Dr. Joseph J. Combs, 716 Professional Bldg., Raleigh.

NORTH DAKOTA: *Examination.* Grand Forks, July 9-11. *Reciprocity.* Grand Forks, July 12. Sec., Dr. C. J. Glaspel, Grafton.

OHIO: *Examination.* Columbus, June 17-20. Sec., Dr. H. M. Platter, 21 W. Broad St., Columbus 15.

OKLAHOMA:* *Examination.* Oklahoma City, June 4-5. Sec., Dr. Clinton Gallaher, 813 Braniff Bldg., Oklahoma City.

SOUTH DAKOTA:* Rapid City, July 15. Sec., Dr. C. B. McVay, Yankton Clinic, Yankton.

TEXAS: Fort Worth, June 19-21. Sec., Dr. M. H. Crabb, 1714 Medical Arts Bldg., Fort Worth.

UTAH: *Examination.* Salt Lake City, July. Asst. Dir., Mr. Frank E. Lees, 314 State Capitol Bldg., Salt Lake City 1.

VIRGINIA: *Examination.* Richmond, June 12-14. *Reciprocity.* Richmond, June 11. Sec., Dr. K. D. Graves, 631 First St., S.W., Roanoke.

VIRGIN ISLANDS: St. Thomas, June 4-5. Sec., Dr. Earle M. Rice, St. Thomas.

WASHINGTON: Seattle, July. Sec., Mr. Edward C. Dohm, Department of Licenses, Olympia.

WISCONSIN:* Milwaukee, July 8-10. Sec., Dr. A. G. Koehler, 46 Washington Blvd., Oshkosh.

BOARDS OF EXAMINERS IN THE BASIC SCIENCES

ALASKA: *Examination.* On application. Juneau or other towns in Territory as decided by Board. *Reciprocity.* On application. Sec., Dr. C. Earl Albrecht, Box 1931, Juneau.

FLORIDA: Gainesville, June 7. *Examination.* Sec., Mr. M. W. Emmel, Box 340, University of Florida, Gainesville.

MICHIGAN: *Examination.* May. Sec., Miss Eloise LeBeau, 501 W. Michigan Ave., Lansing 15.

OREGON: *Examination.* Portland, June 7, Sept. 6 and Dec. 6. Sec., Dr. Charles D. Byrne, State Board of Higher Education, University of Oregon, Eugene.

SOUTH DAKOTA: Vermillion, June 13-14. Sec., Dr. Gregg M. Evans, 310 E. 15th St., Yankton.

WISCONSIN: *Examination.* Milwaukee, June 7 and Sept. 13. Sec., Mr. W. H. Barber, Ripon College, Ripon.

* Basic Science Certificate required.

MEETINGS

American Medical Association, Chicago, June 9-13. Dr. George F. Lull, 535 North Dearborn St., Chicago 10, Secretary.

AMERICAN ACADEMY OF PEDIATRICS, Areal Meeting, Hotel Statler, Washington, D. C., May 22-24. Dr. E. H. Christopherson, 636 Church St., Evanston, Ill., Executive Secretary.

AMERICAN ACADEMY OF TUBERCULOSIS PHYSICIANS, Chicago, June 7. Dr. Oscar S. Levin, P. O. Box 7011, Denver, Secretary.

AMERICAN ASSOCIATION OF GENITO-URINARY SURGEONS, Seaview Country Club, Absecon, N. J., June 19-21. Dr. Norris J. Heckel, 122 South Michigan Ave., Chicago 3, Secretary.

AMERICAN ASSOCIATION ON MENTAL DEFICIENCY, Hotel Bellevue-Stratford, Philadelphia, May 26-31. Dr. Neil A. Dayton, P. O. Box 96, Willimantic, Conn., Secretary.

AMERICAN BLOOD IRRADIATION SOCIETY, Conrad Hilton Hotel, Chicago, June 7-8. Dr. H. T. Lewis, 5230 Center Ave., Pittsburgh, Secretary.

AMERICAN BRONCHO-ESOPHAGOLOGICAL ASSOCIATION, Royal York Hotel, Toronto, Canada, May 20-21. Dr. Edwin N. Broyles, 1100 North Charles St., Baltimore 1, Secretary.

AMERICAN COLLEGE OF CHEST PHYSICIANS, Congress Hotel, Chicago, June 5-8. Mr. Murray Kornfeld, 112 East Chestnut St., Chicago, Executive Secretary.

AMERICAN COLLEGE OF SURGEONS, SECTIONAL MEETINGS:
Toronto, Canada, Royal York Hotel, May 15-17. Dr. Stuart D. Gordon, 170 St. George St., Toronto 5, Canada, Chairman.

AMERICAN DIABETES ASSOCIATION, Drake Hotel, Chicago, June 7-8. Dr. J. A. Reed, 11 West 42d St., New York 36, Secretary.

AMERICAN GERIATRICS SOCIETY, Hotel LaSalle, Chicago, June 5-7. Dr. Malford W. Thewlis, 25 Mechanic St., Wakefield, R. I., Secretary.

AMERICAN GYNECOLOGICAL SOCIETY, The Homestead, Hot Springs, Va., May 12-14. Dr. John I. Brewer, 104 South Michigan Ave., Chicago, Secretary.

AMERICAN HEARING SOCIETY, Chicago, June 28. Mrs. Francis E. Lee, 817 14th St. N.W., Washington 5, D. C., Secretary.

American Laryngological Association, Royal York Hotel, Toronto, Canada, May 23-24. Dr. Louis H. Clerf, 1530 Locust St., Philadelphia 2, Secretary.

American Laryngological, Rhinological and Otological Society, Royal York Hotel, Toronto, Canada, May 20-22. Dr. C. Stewart Nash, 277 Alexander St., Rochester 7, N. Y., Secretary.

American Medical Women's Association, Chicago, June 8. Dr. Irma Henderson-Smathers, 610 Medical Bldg., Asheville, N. C., Corresponding Secretary.

American Ophthalmological Society, Hot Springs, Va., June 5-7. Dr. Maynard C. Wheeler, 30 West 59th St., New York 19, Secretary.

American Orthopedic Association, London, England, June 30-July 4. Dr. C. Leslie Mitchell, Henry Ford Hospital, Detroit 2, Secretary.

American Otological Society, Royal York Hotel, Toronto, Canada, May 18-19. Dr. John R. Lindsay, 950 East 59th St., Chicago 37, Secretary.

American Proctologic Society, Milwaukee, June 4-7. Dr. Stuart T. Ross, 131 Fulton Ave., Hempstead, L. I., N. Y., Secretary.

American Psychiatric Association, Atlantic City, N. J., May 12-16. Dr. R. Finley Gayle Jr., 6300 Three Chopt Rd., Richmond 21, Va., Secretary.

American Radium Society, Chicago, June 8. Dr. John Wirth, 635 Herkimer St., Pasadena 1, Calif., Secretary.

American Rheumatism Association, Conrad Hilton Hotel, Chicago, June 6-7. Dr. William H. Kammerer, 33 East 61st St., New York 21, Secretary.

American Society for the Study of Sterility, Chicago, June 7-8. Dr. Walter W. Williams, 20 Magnolia Terrace, Springfield 8, Mass., Secretary.

American Therapeutic Society, Blackstone Hotel, Chicago, June 5-8. Dr. Oscar B. Hunter Jr., 915 Nineteenth St. N.W., Washington 6, D. C., Secretary.

American Trudeau Society, Hotel Statler, Boston, May 26. Dr. John D. Steele, 1790 Broadway, New York 19, Secretary.

American Urological Association, Chalfonte-Haddon Hall, Atlantic City, N. J., June 23-26. Dr. Charles H. deT. Shivers, Boardwalk National Arcade Bldg., Atlantic City, N. J., Secretary.

Catholic Hospital Association of the United States and Canada, Cleveland, May 26-29. Rev. John J. Flanagan, S.J., 1438 South Grand Blvd., St. Louis 4, Director.

Georgia, Medical Association of, Atlanta-Biltmore Hotel, Atlanta, May 12-14. Dr. David H. Poer, 875 West Peachtree St. N.E., Atlanta, Secretary.

Idaho State Medical Association, Sun Valley, June 15-18. Dr. Robert S. McKeon, 305 Sun Bldg., Boise, Secretary.

Illinois State Medical Society, Hotel Sherman, Chicago, May 13-15. Dr. Harold M. Camp, 224 South Main St., Monmouth, Secretary.

Maine Medical Association, Samoset Hotel, Rockland, June 22-24. Mr. W. Mayo Payson, 142 High Street, Portland 3, Executive Secretary.

Massachusetts Medical Society, Hotel Statler, Boston, May 19-22. Dr. H. Quimby Gallupe, 22 Fenway, Boston 15, Secretary.

Medical Library Association, Lake Placid Club, Lake Placid, N. Y., June 24-27. Miss Caroline Riechers, 1758 West Harrison St., Chicago 12, Secretary.

Minnesota State Medical Association, Minneapolis, May 26-28. Dr. B. B. Souster, 496 Lowry Medical Arts Bldg., St. Paul 2, Secretary.

Mississippi State Medical Association, Jackson, May 13-15. Mr. Roland B. Kennedy, 508 First Federal Bldg., Jackson, Executive Secretary.

National Tuberculosis Association, Copley Plaza and Statler Hotels, Boston, May 26-30. Mr. Kemp D. Battle, 1790 Broadway, New York 19, Secretary.

Nebraska State Medical Association, Cornhusker Hotel, Lincoln, May 12-15. Dr. R. B. Adams, 1315 Sharp Bldg., Lincoln 8, Secretary.

New Jersey, Medical Society of, Haddon Hall, Atlantic City, May 19-21. Dr. Marcus H. Greifinger, 315 West State St., Trenton 8, Secretary.

New York, Medical Society of the State of, Hotel Statler, New York, May 12-16. Dr. Walter P. Anderton, 292 Madison Ave., New York 17, Secretary.

Ogden Surgical Society, Orpheum Theater, Ogden, Utah, May 21-23. Dr. George M. Fister, Ogden, Utah, President.

Ohio State Medical Association, Cleveland, May 20-22. Mr. Charles S. Nelson, 79 East State St., Columbus 15, Executive Secretary.

Oklahoma State Medical Association, Oklahoma City, May 19-21. Mr. R. H. Graham, 1227 Classen St., Oklahoma City, Executive Secretary.

Society for Investigative Dermatology, Hotel Sherman, Chicago, June 7-8. Dr. Herman Beerman, 255 South 17th St., Philadelphia 3, Secretary.

Society for Vascular Surgery, Chicago, June 8, Dr. George D. Lilly, 331 Ingraham Bldg., Miami 32, Fla., Secretary.

Society of Biological Psychiatry, Hotel Claridge, Atlantic City, N. J., May 11. Dr. George N. Thompson, 1136 West Sixth St., Los Angeles 17, Secretary.

South Carolina Medical Association, Ocean Forest Hotel, Myrtle Beach, May 13-15. Dr. N. B. Heyward, 120 West Cheves St., Florence, Secretary.

South Dakota State Medical Association, Sioux Falls, May 18-20. Dr. L. J. Pankow, 302 First National Bank Bldg., Sioux Falls, Secretary.

Southern Oregon Medical Society, Roseburg, May 13. Dr. F. C. Adams, 1435 Esplanade St., Klamath Falls, Secretary.

The Endocrine Society, Palmer House, Chicago, June 5-7. Dr. Henry H. Turner, 1200 North Walker St., Oklahoma City 3, Secretary.

Upper Peninsula Medical Society, Country Club, Iron Mountain, Mich., June 27-28. Dr. E. Theodore Palm, 412 Superior Ave., Crystal Falls, Mich., Secretary.

Wyoming State Medical Society, Nobel Hotel, Lander, June 5-7. Dr. Glenn W. Koford, 2020 Carey Ave., Cheyenne, Secretary.

INTERNATIONAL

Australasian Medical Congress, Melbourne Victoria, Australia, Aug. 22-30. Dr. C. H. Dickson, Medical Society Hall, 426 Albert St., East Melbourne, Victoria, Australia, General Secretary.

Commonwealth and Empire Health and Tuberculosis Conference, Central Hall, London, England, July 8-13. Dr. J. H. Harley Williams, Tavistock House North, Tavistock Sq., London, W.C.1, England, Secretary General.

Congress of the International Diabetes Federation, Leyden, Netherlands, July 7-12. Dr. F. Gerritzen, 33, Prinsegracht, The Hague, Netherlands, Secretary.

European Congress of Cardiology, University of London, Bloomsbury, W.C.1, England, Sept. 10-12. Dr. K. Shirley Smith, 35 Wimpole St., London, W.1, England, Secretary.

European Society of Cardiovascular Surgery, Strasbourg, France, Oct. 3-4. Sir James Learmonth, Department of Surgery, University New Buildings, Edinburgh 8, Scotland.

Interamerican Cardiological Congress, Buenos Aires, Argentina, Aug. 31-Sept. 7. Dr. Blas Moia, Larrea 1132, Buenos Aires, Argentina, Secretary-General.

Inter-American Congress of Public Health, Havana, Cuba, Sept. 27-Oct. 1. Pan-American Sanitary Bureau, 2001 Connecticut Ave., Washington, D. C.

Inter-American Congress of Radiology, Mexico City, Mexico, Nov. 2-8. Dr. Guido Torres Martinez, Marsella No. 11, Mexico, D.F., Secretary-General.

International College of Surgeons, Madrid, Spain, May 20-24. Dr. Max Thorek, 850 West Irving Park Road, Chicago, Ill., U. S. A., Secretary-General.

International Congress of Acupuncture, Hall of Conferences, Maison du Medecin, Paris, France, May 17-20. Secretariat, 8, Avenue Franklin Roosevelt, Paris, VIIIe, France.

International Congress of Biochemistry, Paris, France, July 21-27. Prof. Jean Courtois, 4, Avenue de l'Observatoire, Paris 6e, France, Secretary.

International Congress of Dermatology and Syphilology, London, England, July 21-26. Dr. Gordon B. Mitchell-Heggs, 5, Lisle St., London, W.C.2, England, General Secretary.

International Congress of Dietetics, Royal Tropical Institute, Amsterdam, The Netherlands, July 7-11. Miss Diane J. Ten Haaf, Educational Bureau of the Nutritional Council, 42 Koninginnegracht, The Hague, Netherlands, General Secretary.

International Congress on Diseases of the Chest, Rio de Janeiro, Brazil, Aug. 24-30. Mr. Murray Kornfeld, 112 East Chestnut St., Chicago 11, Illinois, Executive Secretary.

International Congress of Haematology, Mar del Plata, Argentina, Sept. 21-26. Dr. Carlos Reussi, Anchorena 1710, Buenos Aires, Argentina, Secretary.

International Congress of Health Technicians, Palais de la Mutualite, Paris, France, June 9-14. Secretariat General, 6 Square Desaix, Paris XVe, France.

International Congress of the History of Medicine, Nice-Cannes, France, and Monaco, Sept. 8-18. Dr. F. A. Sondervorst, 124 Avenue des Allies, Louvain, Belgium, Secretary-General.

International Congress on Hydatid Diseases, Santiago, Chile, Nov. 21-24. Organizing Committee, P. O. Box 9183, Santiago, Chile.

International Congress of Internal Medicine, Friends House, London, N.W.1, Eng. Sept. 15-18. Sir Harold Boldero, 12 Pall Mall East, London, S.W.1, England, Secretary.

International Congress on Medical Records, London, England, Sept. 7-12. Miss Gwen Perkins, 120 C Street S.E., Washington, D. C., Chairman.

International Congress of Medicine and Sport, Paris, France. May 29-June 1. Prof. Chailley-Bert, 1 rue Lacretelle, Paris 15e, France, Chairman.

International Congress on Neuropathology, Rome, Italy, Sept. 8-13. Dr. Armando Ferraro, 722 W. 168th St., New York, N. Y., U. S. A., Secretary General.

International Congress of Physical Medicine, London, England, July 14-19. Dr. A. C. Boyle, 45, Lincoln's Inn Fields, London, W.C.2, England, Hon. Secretary.

International Congress of Physiopathology of Animal Reproduction and Artificial Insemination, Copenhagen, Denmark, July 7-10. Prof. Ed. Sorensen, The Royal Veterinary and Agricultural College, Bülowsvej 13, Copenhagen V, Denmark.

International Congress of Urology, The Waldorf-Astoria, New York, N. Y., U. S. A., Sept. 15-18. Dr. John A. Taylor, 2 East 54th St., New York, N. Y., U. S. A., Secretary-General.

International Society of Geographic Pathology, Liège, Belgium, July 15-18. Dr. Fred C. Roulet, Habelstr. 24, Basel, Switzerland, Secretary General.

International Union Against Tuberculosis, Rio de Janeiro, Brazil, Aug. 24-27. Prof. Etienne Bernard, 66 Blvd. St. Michel, Paris 6e, France, Secretary-General.

Neuroradiologic Symposium, Stockholm, Sweden, Sept. 17-20. Docent Ake Lindbom, Symposium Neuroradiologicum, Serafimerlasarettet, Stockholm K., Sweden, Secretary.

Pan-American Congress of Gastroenterology, Mexico City, D.F., May 11-17. Dr. R. Flores-Lopez, Calle Dr. Balmis, No. 148, Mexico City, D.F., Secretary.

World Medical Association, Athens, Greece, Oct. 12-16. Dr. Louis H. Bauer, 2 East 103d St., New York 29, N. Y., Secretary General.

DEATHS

Haden, Russell Landram ⊕ Crozet, Va., since 1942 a member of the Council on Medical Education and Hospitals of the American Medical Association, died in the Cleveland Clinic Hospital, April 26, aged 63, following a subarachnoid hemorrhage. He was in Cleveland participating in the meeting of the American College of Physicians and collapsed following a television broadcast. Dr. Haden was born in Palmyra, Va., May 22, 1888. He obtained the A.B. degree in 1910 and the A.M. degree in 1911 from the University of Virginia. After graduating from Johns Hopkins University School of Medicine, Baltimore, in 1915, and serving as intern and resident house officer at the Johns Hopkins Hospital, he was appointed assistant resident physician and director of laboratories at the Henry Ford Hospital, Detroit. From 1921 to 1923, he was associate professor of medicine at the University of Kansas School of Medicine, Kansas City, Kan., and from 1923 to 1930 was professor of experimental medicine. Dr. Haden joined the Cleveland (Ohio) Clinic as head of the department of medicine in 1930 and retired in 1949. During World War I he was a first lieutenant in the medical corps of the U. S. Army, serving as assistant chief of the medical service, base hospital, Camp Lee, Va. He was secretary of the Section on Pharmacology and Therapeutics of the American Medical Association from 1933 to 1936, vice-chairman, 1936-1937, chairman, 1937-1938 and member of the House of Delegates representing this section during 1939-1940. He was appointed in 1939 to serve as the Association's representative on the Division of Medical Sciences of the National Research Council for a period of three years. At the 1926 annual session of the American Medical Association, Dr. Haden received the Bronze Medal in the Scientific Exhibit for bacteriological study of periapical dental infections; at the 1934 session he received a Certificate of Merit for excellent presentation of an exhibit illustrating the examination of the blood and at the 1941 session a special Certificate of Merit for an exhibit on the origin and early history of the microscope. In 1942, Dr. Haden was appointed a member of the Council on Medical Education and Hospitals for the term ending in 1943, was appointed to a seven-year term in 1943, and was reappointed for a seven-year term in 1950. For the past year Dr. Haden served as chairman of the Council's Conference Committee on Graduate Training in Medicine. He was a specialist certified by the American Board of Internal Medicine, a member of the Central Society of Clinical Research, American Rheumatism Society (formerly known as American Association for the Study and Control of Rheumatic Diseases, of which he had been president in 1936), Association of American Physicians, American Society for Clinical Investigation, American Clinical and Climatological Association, of which he had been vice-president in 1936, American Association of Pathologists and Bacteriologists and the American Society of Clinical Pathologists, serving as vice-president in 1941, and a fellow of the American College of Physicians. Dr. Haden was a member of the Phi Beta Kappa, Sigma Xi, Theta Delta Chi, Nu Sigma Nu, and Alpha Omega Alpha fraternities. In 1929 he was awarded the gold medal by the Radiological Society of North America for contributions to dental roentgenology. He was a consultant in hematology to the Surgeons General of the U. S. Army and Navy, and was appointed medical director of the Red Cross National Blood Program in October, 1950, and was serving in this capacity at the time of his death. He was the author of "Clinical Laboratory Methods," "Dental Infection and Systemic Disease," and "Principles of Hematology," and he contributed numerous articles to medical journals.

Mountin, Joseph W. ⊕ Washington, D. C., chief of the Bureau of State Services of the U. S. Public Health Service, died in the Naval Medical Center, Bethesda, Md., April 26, aged 61. Dr. Mountin was born in Hartford, Wis., Oct. 13, 1891. He received his medical degree from Marquette University School of Medicine, Milwaukee in 1914 and after completing internships at the Milwaukee County Hospital and at the Chicago Lying-In Hospital engaged in graduate study in Boston and New York. He organized and directed the Marquette University Clinic, and then began his career with the Public Health Service during World War I. He was director of the division of public health methods from 1937 to 1939 and of the States Relations Division from 1943 to 1947, when he assumed the post of associate chief of the Bureau of State Services. As chief of the States Relations Division, Dr. Mountin administered the program of federal financial grants-in-aid to the states for public health purposes. During World War II he administered a nationwide emergency health and sanitation program for extracantonment and critical war areas. Two of the major field stations of the Bureau of State Services—the Communicable Disease Center at Atlanta, Ga., and the Arctic Health Research Center at Anchorage, Alaska—were established largely through Dr. Mountin's efforts. A public health service officer for 35 years, he was appointed bureau chief on Nov. 1, 1951, with the rank of assistant surgeon general. He was a member of the intergovernmental committee on aging and geriatrics. Dr. Mountin was vice-chairman of the Section on Preventive and Industrial Medicine and Public Health of the American Medical Association in 1941 and 1942 and chairman in 1943-1944; a member of the Southern Medical Association, of which he was chairman of the public health section, 1935-1936; and a member of the American Public Health Association, serving as secretary of the health officers section, 1934-1935, and as a member of the committee on administrative practice since 1925. He was a specialist certified by the American Board of Preventive Medicine and Public Health, was formerly an instructor of preventive medicine at Vanderbilt University in Nashville, Tenn., and from 1927 to 1931 a special assistant to the commissioner of the Tennessee State Health Department. Dr. Mountin was an adviser to the Bhore Commission of India, a member of the Social Security Mission to Japan, and a member of the technical committee on medical care of the interdepartmental committee of health and welfare. He contributed numerous articles to professional publications.

Alden, George Albert ⊕ Captain, U. S. Navy, retired, Philadelphia; born in Leicester, Vt., in 1891; University of Vermont College of Medicine, Burlington, 1917; commissioned a lieutenant (jg) in the medical corps of the U. S. Naval Reserve on May 19, 1917; transferred to the regular navy in 1918; during most of World War I served as medical officer aboard transports; was senior medical officer aboard the *USS Houston*, which made the presidential cruise to Gallapagos Island with the late President Franklin D. Roosevelt; served in the Washington, D. C., area on three occasions, the first being at the Naval Medical School, then at the Navy's Bureau of Medicine and Surgery, and finally on the Marine Retirement Board; served as executive officer, U. S. Naval Hospital, Portsmouth, Va., and commanding officer, U. S. Naval Hospitals, Bainbridge, Md., and Portsmouth, N. H.; placed on the retired list on Nov. 1, 1950; fellow of the American College of Physicians; pathologist, J. Lewis Crozer Homeopathic Hospital in Chester; died March 17, aged 60, probably of coronary occlusion.

Conklin, Coursen Baxter ⊕ Washington, D. C.; born in Peekskill, N. Y., Feb. 3, 1884; George Washington University School of Medicine, Washington, 1907; clinical professor of medicine at his alma mater; member of the House of Delegates of the American Medical Association from 1944 to 1949; life member and formerly secretary-treasurer of the Medical Society of the District of Columbia and a founder and managing editor of the society's journal; member of the American Academy of Pediatrics; past president and secretary of the Washington Medical and Surgical Society; past president of George Washington University Medical Society; fellow of the American College of Physicians; specialist certified by the American Board of Internal Medicine; served during World War I; associate attend-

⊕ Indicates Fellow of the American Medical Association.

ing physician, Children's Hospital; consulting pediatrician, Eastern Dispensary and Casualty Hospital; pediatrician, Florence Crittenton Home; died in Doctor's Hospital March 2, aged 68, of arteriosclerotic heart disease.

Agee, James Clarence, Fremont, Neb.; University of Nebraska College of Medicine, Omaha, 1903; died Feb. 25, aged 75, of a heart attack.

Anderson, William Willis ⊕ Atlanta, Ga.; Johns Hopkins University School of Medicine, Baltimore, 1916; associate professor of clinical pediatrics at Emory University School of Medicine; specialist certified by the American Board of Pediatrics; member of the American Academy of Pediatrics; affiliated with Georgia Baptist, Emory (Ga.) University, Grady, and Piedmont hospitals; formerly on the faculty of his alma mater and on the staff of Johns Hopkins Hospital in Baltimore; died Feb. 1, aged 63, of cerebral hemorrhage and arteriosclerosis.

Apperman, Isaac, Brooklyn; University and Bellevue Hospital Medical College, New York, 1920; specialist certified by the American Board of Internal Medicine; member of the Endocrine Society; for many years consultant for the board of health of New York City and the Union Health Center of the International Ladies Garment Workers Union; died in Mount Sinai Hospital, New York, March 16, aged 55, of coronary thrombosis.

Armitage, Clayton Webb, Harbor Beach, Mich.; University of Michigan Department of Medicine and Surgery, Ann Arbor, 1892; president of the State Bank; died Feb. 25, aged 84, of uremia.

Armstrong, James Lewis, Brooklyn; New York University Medical College, New York, 1897; died March 15, aged 89.

Arnold, Clifford Hood ⊕ Tucson, Ariz.; Medical College of Virginia, Richmond, 1913; member of the Medical Society of the State of Pennsylvania; on the staff of the Veterans Administration Hospital, where he died Jan. 26, aged 63, of myocardial infarction.

Baehr, Louis Theodore, Madison, Wis.; University of Wisconsin Medical School, Madison, 1943; member of the American Medical Association; served during World War II; resident, State of Wisconsin General Hospital; died March 4, aged 34, of coronary occlusion and duodenal ulcer.

Baerecke, Vida Ziegler, Orange City, Fla.; Woman's Medical College of Baltimore, 1895; died in Deland, Jan. 30, aged 86, of pneumonia.

Bagnall, Loyal Bland ⊕ De Kalb, Ill.; Loyola University School of Medicine, Chicago, 1922; died Dec. 10, aged 64.

Barkley, James Wesley, Belzoni, Miss.; University of Tennessee College of Medicine, Memphis, 1927; member of the American Medical Association; served as vice president of the Delta Medical Society; on the staff of Humphreys County Memorial Hospital; county health officer; died March 7, aged 53, of cirrhosis of the liver.

Barnard, Albert Leroy, Portage Des Sioux, Mo.; Homeopathic Medical College of Missouri, St. Louis, 1896; Barnes Medical College, St. Louis, 1898; died in St. Joseph's Hosptial, St. Charles, Feb. 28, aged 90, as the result of a fall.

Bateman, Jesse Fremont ⊕ Columbus, Ohio; University of Cincinnati College of Medicine, 1928; clinical professor of neurology and psychiatry at Ohio State University College of Medicine; member of the American Psychiatric Association and Central Neuropsychiatric Association; formerly commissioner of the division of mental diseases in the state welfare department; served as secretary of the Ohio State Medical Association; died in Albert Merritt Billings Hospital, Chicago, Dec. 28, aged 54.

Bates, Irby Clyde ⊕ Dothan, Ala.; University of Alabama School of Medicine, 1911; died Feb. 16, aged 64.

Berger, Henry Irving, Indianapolis; University and Bellevue Hospital Medical College, New York, 1908; member of the American Medical Association; on the staffs of Methodist and St. Vincent's hospitals; died Jan. 7, aged 64, of cerebral thrombosis and arteriosclerosis.

Berry, John Walter, Cape Girardeau, Mo.; Barnes Medical College, St. Louis, 1896; member of the American Medical Association; served during World War I; affiliated with Southeast Missouri Hospital; died in Tomahawk, Wis., Feb. 9, aged 80, of myocarditis and chronic nephritis.

Berry, Orland Harley, Bluffs, Ill.; Barnes Medical College, St. Louis, 1905; died in Our Saviour's Hospital, Jacksonville, March 3, aged 72, of carcinoma of the right lung.

Berryhill, William Griffith, Orangeville, Pa.; Baltimore Medical College, 1895; member of the American Medical Association; served during World War I; affiliated with Bloomsburg (Pa.) Hospital; died Feb. 25, aged 85, of carcinoma of the throat and esophagus.

Bibb, James Lewis Leitch ⊕ Chattanooga, Tenn.; University of Virginia Department of Medicine, Charlottesville, 1912; specialist certified by the American Board of Internal Medicine; member of the American College of Chest Physicians; fellow of the American College of Physicians; past president of the Chattanooga-Hamilton County Medical Society; served as chief of staff, Pine Breeze Sanatorium and Baroness Erlanger Hospital; affiliated with Newell Hospital and Memorial Hospital, where he died Feb. 17, aged 66, of coronary occlusion.

Bice, Clyde William ⊕ Oakland, Calif.; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1902; died Feb. 27, aged 75.

Bilodeau, Charles Cloudman ⊕ Kalamazoo, Mich.; Columbia University College of Physicians and Surgeons, New York, 1936; died Dec. 5, aged 40.

Bing, William Arthur, West Albany, N. Y.; Albany (N. Y.) Medical College, 1909; formerly superintendent of Montgomery Sanatorium, Amsterdam, N. Y.; died in Albany Hospital, March 11, aged 71, of arteriosclerosis and diabetes mellitus.

Blochowiak, Norbert Paul, Rushford, Minn.; University of Minnesota Medical School, Minneapolis, 1949; member of the American Medical Association; killed Jan. 20, aged 29, when his automobile was struck by a train.

Boland, Thomas Barrett, River Forest, Ill.; Illinois Medical College, Chicago, 1910; member of the American Medical Association; died in Memorial Hospital, New York, Feb. 21, aged 67, of primary carcinoma of the liver.

Bowing, Irwin Ellis ⊕ Kenosha, Wis.; Rush Medical College, Chicago, 1921; specialist certified by the American Board of Radiology; member of the Radiological Society of North America and the American College of Radiology; affiliated with Kenosha and St. Catherine's hospitals; died Feb. 24, aged 59, of cerebral hemorrhage.

Brice, James Arthur, Tarrant, Ala.; Birmingham Medical College, 1913; member of the American Medical Association; died Feb. 24, aged 70, of coronary thrombosis.

Brocke, Alfred, Muskegon, Mich.; National Medical College, Chicago, 1904; died Dec. 26, aged 83, of chronic myocarditis.

Browne, Alfred David, Palo Alto, Calif.; Memphis (Tenn.) Hospital Medical College, 1907; formerly medical and physical education director of universities in North Carolina, Oregon, Florida, and Louisiana; and of Stanford University; died March 6, aged 72, of carcinoma of the stomach.

Coggeshall, Trovalo Chester, Rochelle, Ill.; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1904; member of the American Medical Association; served during World War I; died in St. Luke's Hospital, Chicago, March 23, aged 71, of recurrent carcinoma of the colon.

Criss, Clair Carlton, Omaha; Creighton University School of Medicine, Omaha, 1912; chairman of the board of three insurance companies; died March 9, aged 72, of heart disease.

Dickins, William Butts, Greenwood, Miss.; Louisville (Ky.) Medical College, 1896; died in Greenwood-Lefiore Hospital March 16, aged 80.

Graham, Emmet Vance ✦ Denver; Kentucky School of Medicine, Louisville, 1902; chief medical examiner for the Summit County Draft Board during World War I; at one time practiced in Breckenridge, where he was county coroner; on the staff of Presbyterian Hospital, where he died Jan. 17, aged 81, of carcinoma of the kidney with metastasis.

Grossman, William L. ✦ North Vernon, Ind.; Illinois Medical College, Chicago, 1907; died Feb. 10, aged 72, of pneumonia, following injuries received in an automobile accident.

Ham, Joseph Gardiner, Portland, Maine; University of Rochester School of Medicine and Dentistry, Rochester, N. Y., 1939; served during World War II; member of the American Medical Association; resident pathologist at Highland Hospital in Rochester, N. Y.; died in Rochester, N. Y., Feb. 11, aged 39, of coronary occlusion.

Harmeyer, Mark Edward, Detroit; Marquette University School of Medicine, Milwaukee, 1935; served during World War II; died in Battle Creek Feb. 17, aged 47, of pulmonary tuberculosis.

Harrell, Bryant Eugene ✦ Norfolk, Va.; Johns Hopkins University School of Medicine, Baltimore, 1914; specialist certified by the American Board of Urology; member of the American Urological Association; fellow of the American College of Surgeons; past president of the Virginia Urological Society and Norfolk County Medical Society; served during World War I; on the staffs of the De Paul, Norfolk General, and Leigh Memorial hospitals; died Feb. 12, aged 65, of carcinoma of the lung.

Heller, Oscar S., Greenfield, Ind.; Medical College of Indiana, Indianapolis, 1897; member of the American Medical Association; served as county health officer; formerly county coroner and secretary of the board of health of Greenfield; died Feb. 14, aged 79, of cerebral embolus and chronic auricular fibrillation.

Herrin, Frederick Sturgis, Summit, Miss.; Medical College of Alabama, Mobile, 1902; on the staff of the Beacham Memorial Hospital in Magnolia; died Feb. 6, aged 72, of acute coronary occlusion.

Heyser, David Thomas, Atlanta, Ga.; University of Louisville (Ky.) Medical Department, 1909; member of the American Medical Association; died Jan. 30,, aged 65, of aneurysm of the abdominal aorta.

Hoffman, Ira Elmer, North Hollywood, Calif.; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1909; formerly medical director of the Washington National Insurance Company, Evanston, Ill.; died Feb. 11, aged 69.

Hood, Arch John, Milwaukee; Jefferson Medical College of Philadelphia, 1918; member of the American Medical Association; served as chief of staff of Milwaukee Hospital; died Feb. 9, aged 60, of coronary arteriosclerosis.

Horger, Edgar Olin, Jr., Greenville, S. C.; Medical College of the State of South Carolina, Charleston, 1937; member of the American Medical Association; served during War World II; died in Jacksonville, Fla., Nov. 26, aged 42, of coronary thrombosis.

Jessup, David Stuart Dodge ✦ New York; College of Physicians and Surgeons, medical department of Columbia University, New York, 1894; specialist certified by the American Board of Pathology; member of the College of American Pathologists; formerly assistant professor of clinical pathology at his alma mater; affiliated with the New York Eye and Ear Infirmary and St. Luke's Hospital; died in Detroit Feb. 2, aged 82.

Kemp, Milburn Watts, North Madison, Ind.; University of Toronto Faculty of Medicine, Toronto, 1920; member of the American Medical Association and the American Psychiatric Association; served during World War I; superintendent of Madison State Hospital; formerly superintendent of the Anoka (Minn.) State Hospital; died in St. Joseph Infirmary, Louisville, Ky., Feb. 6, aged 57.

Kiley, Joseph Lawrence, Saratoga Springs, N. Y.; Albany (N. Y.) Medical College, 1931; member of the American Medical Association; served as medical supervisor for claims under the county department of public welfare; served during World War II; past president of the staff of the Saratoga Hospital; died Feb. 24, aged 49, or coronary occlusion.

Landes, Edwin Walter, Stillwater, N. J.; Columbia University College of Physicians and Surgeons, New York, 1900; on the staff of the Newton (N. J.) Memorial Hospital; physician at the Sussex County Welfare Home for many years; died Feb. 9, aged 83, of coronary thrombosis.

Lehrfeld, Louis ✦ Philadelphia; Medico-Chirurgical College of Philadelphia, 1912; specialist certified by the American Board of Ophthalmology; member of the American Academy of Ophthalmology and Otolaryngology; in 1937 resigned as epidemiologist of the Philadelphia Department of Public Health after 22 years' service; served on the staff of Wills Eye Hospital; consultant in ophthalmology, Philadelphia General and Jewish hospitals; died Feb. 6, aged 61, of metastatic carcinoma.

Lombardo, Melchiore, Brooklyn; Regia Università di Napoli Facoltà di Medicina e Chirurgia, Italy, 1900; specialist certified by the American Board of Ophthalmology; member of the American Medical Association and American Academy of Ophthalmology and Otolaryngology; affiliated with Wyckoff Heights and Brooklyn Eye and Ear hospitals; died in Long Island College Hospital Feb. 10, aged 76, of heart failure.

Long, James Walter ✦ Pittsburgh; Tulane University of Louisiana School of Medicine, New Orleans, 1926; formerly mayor of Port Arthur, Texas; certified by the National Board of Medical Examiners; member of the Industrial Medical Association and the State Medical Association of Texas; served during World Wars I and II; past president of the Jefferson County (Texas) Medical Society; served on the state board of health of Texas; past president of St. Mary's hospital staff in Port Arthur; medical director for the Gulf Oil Corporation; died Feb. 17, aged 52.

Love, John William Pendleton ✦ Willow Grove, Pa.; University of Pennsylvania School of Medicine, Philadelphia, 1932; specialist certified by the American Board of Pathology; member of the American Society of Clinical Pathologists; fellow of the American College of Physicians; served during World War II; died Nov. 22, aged 45, of glomerulonephritis.

Marvin, Frank William, Marblehead Neck, Mass.; Harvard Medical School, Boston, 1916; served as assistant professor of anesthesiology at Tufts College Medical School in Boston; member of the American Society of Anesthesiologists; specialist certified by the American Board of Anesthesiology; served overseas during World War I; died in Salem (Mass.) Hospital Feb. 3, aged 65, of cerebral hemorrhage.

Miller, Floyd Victor, Delaware, Ohio; Starling-Ohio Medical College, Columbus, 1909; member of the American Medical Association and the American Academy of General Practice; served overseas during World War I and won the Silver Star medal for conspicuous service; died in the University Hospital, Columbus, Dec. 15, aged 68, of sarcoma.

Millen, Lars Johan, Chicago; Bennett Medical College, Chicago, 1911; died March 24, aged 74, of coronary thrombosis and carcinoma of the prostate.

Peeler, Julian Edwin, Woodland, Ga.; University of Georgia Medical Department, Augusta, 1889; died Feb. 14, aged 82, of bronchopneumonia.

Pyle, Charles Consontino, Saltillo, Miss.; Memphis (Tenn.) Hospital Medical College, 1900; died Feb. 13, aged 75.

Smith, William Eugene, Franklin, N. H.; Dartmouth Medical School, Hanover, N. H., 1900; died in Concord Jan. 14, aged 77, of acute renal failure and arteriosclerosis.

Stewart, Oliver Eugene, Arcadia, Calif.; the Hahnemann Medical College and Hospital, Chicago, 1902; member of the American Medical Association; died Dec. 14, aged 77, of pulmonary tuberculosis and hemiplegia.

Stone, Frank P., Laurel Springs, N. J.; Hahnemann Medical College and Hospital of Philadelphia, 1905; member of the American Medical Association; died in Camden Dec. 9, aged 72, of arteriosclerotic heart disease.

Wales, Francis Joseph ✦ Monroe, Conn.; New York University Medical College, New York, 1897; died Dec. 14, aged 76, of arteriosclerotic heart disease.

GOVERNMENT SERVICES

ARMY

Senior Students Selected for Interns.—Appointment of 146 senior medical students for the military intern program of the Army Medical Service has been announced by the Surgeon General. The program, scheduled to get under way July 1, provides that medical students on graduation can be commissioned as first lieutenants in the Medical Corps Reserve and serve their internships in Army hospitals. The students will be assigned to the 10 Army teaching hospitals in the United States and to Tripler Army Hospital in Hawaii. Ninety-eight of those selected, including the three women in the group, have previously served in the armed forces. In applying, each student was allowed to indicate three hospitals, in order of preference, in which he desired to receive his internship.

AIR FORCE

Aviation Medical Examiners.—The largest class of aviation medical examiners trained at the Air Force School of Aviation Medicine Randolph Field, Texas, since World War II was graduated April 12. This class received the full 11 weeks of instruction. It contained no representatives of foreign air forces and no officers above the rank of captain. Of the 40 captains and 57 first lieutenants, all but six are reserve officers.

Seventeen of the doctors have had previous duty overseas, nine of them during World War II. Three of these were pilots before they studied medicine. Two were bombardiers, and one of them is also a navigator and flight engineer. Their dozen medical specialties range from pediatrics and psychiatry to obstetrics and internal medicine. Two have been certified by specialty boards.

Aviation medical examiners are required to conduct 50 physical examinations for flying and to log 25 hours of flight time in military aircraft before they receive their A. M. E. rating. Their primary duty is to examine cadets, pilots, and air crewmen on flying status. With further study and experience they may qualify as flight surgeons.

DEPARTMENT OF DEFENSE

Armed Forces Medical Library.—The Army Medical Library in Washington, D. C., has recently become the Armed Forces Medical Library by direction of the Secretary of Defense. Now a joint agency of the three military departments, the library will continue to serve both as a national medical library and as the central medical library of the Department of Defense. Subject to the authority, direction, and control of the Secretary of Defense the library will be under the management control of the Secretary of the Army. Its organization will consist of a director, a librarian, an advisory group, and a staff of professional, technical, and clerical personnel.

The director will be an officer selected by the Secretary of the Army, with the approval of the Secretary of Defense, from the medical profession of the Army, Navy, or Air Force. The librarian, a civilian, will be appointed by the director on the recommendation of the advisory group, which will consist of the director, as chairman, a representative from each military department, and not more than five nonmilitary individuals who are prominent either as leaders in medical or health fields or as medical librarians. These civilian members will be appointed by the director, with the approval of the Armed Forces Medical Policy Council. Ordinarily the members will serve no longer than three years, with the exception of the chairman, and their terms will be staggered so that some members will be appointed yearly. In the words of the Secretary of Defense, the library will be dedicated to the advancement of medical sciences in the United States as a whole, as well as within the Department of Defense.

VETERANS ADMINISTRATION

Grants for Wheel Chair Homes.—Grants have been made to 2,272 seriously disabled veterans, including those of the Korean conflict, for "wheelchair" homes, the Veterans Administration announced. The grants total nearly 20.5 million dollars. Another 1,656 veterans have received preliminary approval for such grants.

All veterans of war or peacetime service since 1898 who can not maneuver without the aid of wheel chairs, braces, crutches, canes, or the like may be entitled to these special grants. These veterans must be entitled to compensation for permanent and total service-connected disability for the loss, or loss of use, of both legs due to certain specified conditions.

VA defrays 50% of the cost of "wheelchair" homes for eligible veterans up to a maximum of $10,000 under grants first authorized by Congress in 1948. These homes incorporate such special features as ramps, doorways wide enough to accommodate a wheel chair, special bathroom fixtures, and exercise rooms equipped to meet the needs of the individual persons. The veteran may use the grant in several ways. He may buy a lot and build on it, remodel his present home to suit his needs, or apply the grant against his mortgage if he already has a suitable home.

Residencies Available.—The Crile Veterans Administration Hospital of Cleveland announces that there are openings for residents in ophthalmology, orthopedic surgery, pathology, physical medicine rehabilitation, thoracic surgery, and radiology. The physical medicine rehabilitation residency includes a program of physical therapy, corrective therapy, occupational therapy, educational therapy, and industrial art. A recently opened section for the care of paraplegic patients is also under the department of physical medicine rehabilitation. The stipends range from $2,640 to $3,300 per annum. For information write to Dr. Joseph T. Wearn, Chairman, Dean's Committee, Western Reserve University School of Medicine, 2065 Adelbert Rd., Cleveland 6, Ohio, or to Dr. Leon Ross, Chief, Professional Services, Veterans Administration Hospital, 7300 York Rd., Cleveland 29, Ohio.

Several vacancies for residents in internal medicine, neurosurgery, pathology, physical medicine, and psychiatry, beginning July 1, 1952, are available at the Veterans Administration Hospital, 2002 Holcombe Blvd., Houston 31, Texas. Interested physicians should write to Dr. Warren T. Brown, Chairman of the Dean's Committee, Baylor University College of Medicine, Houston, Texas, or to the Chairman of the Resident Review Board, Veterans Administration Hospital, 2002 Holcombe Blvd., Houston, Texas.

MISCELLANEOUS

Forty-one Grants in Support of Basic Research.—The National Science Foundation has announced approval of 41 research grants, totaling $406,660, in the biological and physical sciences. This is the second group of research awards to be announced this year under the foundation's program for the support of basic research, bringing the total number of announced foundation research grants to 69. Additional proposals are being evaluated by the staff of the foundation with the help of advisory panels of outstanding American scientists. The research fields included are biochemistry, biophysics, chemistry, comparative physiology, developmental biology, endocrinology, engineering, enzyme chemistry, experimental plant biology, genetics, microbiology, oceanography, physics, pharmacology, and systematic biology. The duration of research grants in this group ranges from 1 to 5 years. The average grant amounts to $9,919 per year. The research grants were approved by the National Science Board upon the recommendation of Dr. Alan T. Waterman, director of the foundation.

FOREIGN LETTERS

BOLIVIA

Hospital Facilities in Bolivia.—In a survey recently carried out by the Departamento Nacional de Bioestadística (Vital Statistics Department) and the division of planning and evaluation of programs of the Servicio Cooperativ Interamericano de Salud Pública, it was found that Bolivia has the following hospital facilities. There are 4,860 hospital beds (government and private) for a total population of 3,091,031, or 1.5 beds per 1,000 inhabitants. Because of the inadequate number of hospital beds, many patients with contagious diseases are treated in their homes or continue with their ordinary activities. Of the total number of beds, the government has 3,799 in 37 hospitals distributed throughout the republic, and the private organizations have 1,061.

Maternal and child health facilities include 362 beds in government hospitals for children and pregnant women. On the other hand, the private hospitals devote about one-half of their capacity to pregnant women and only a few beds to children; the remaining beds are for surgical patients. At present, several government hospitals are being constructed; among them are the following institutions: the Children's Hospital in La Paz, 200 beds; the Tuberculosis Hospital, 200 beds; and the Hospital Obrero (Hospital for Laborers), 240 beds.

There are 727 physicians in the country; this means, theoretically, one physician for every 4,215 inhabitants; however, almost all the physicians are concentrated in the urban areas, and two-thirds of the Bolivian population live in the rural areas. There are 259 dentists and 70 registered midwives in the republic.

International Health Meetings of Bolivia, Peru and Chile.—On May 26, 1946, under the sponsorship of the Pan-American Sanitary Bureau, the governments of Bolivia, Peru, and Chile agreed to discuss their common health problems periodically. The first meeting was held in Arica, a Chilean port in the Pacific, located on the crossroads between Bolivia, Peru, and Chile. Malaria, yellow fever, exanthematous typhus, smallpox, and plague were scheduled for permanent periodic discussions, because they are prevalent diseases in two of the three countries concerned.

During the second meeting, which was held in Arica, in February, 1951, each delegate reported the activities of his country.

During the second week of March, 1952, the third international health meeting was held in La Paz. The following delegates were present: Drs. Amador Neghme and Rene Sotomayor from Chile; Dr. Carlos Quiroz from Perú; Drs. Néstor Orihuela, George Bevier, Nemesio Torres, and Luis Gallardo from Bolivia, and Dr. Osvaldo Da Silva from the Pan-American Sanitary Bureau, World Health Organization (W. H. O.) regional office (Lima). Along with the yearly reports given by each delegate, the use of DDT and gamma benzene hexachloride (gammexane) for mosquito control and the use of warfarin for the control of rats was discussed. Among the main recommendations agreed upon, were: (*a*) intensification of the smallpox vaccination, giving preference to the use of the desiccated vaccine in the tropical areas, (*b*) compulsory vaccination for yellow fever, (*c*) control of Aedes aegypti, and (*d*) intensification of the lice control. The Chilean delegation suggested to the Peruvian delegation that there be an integrated malaria campaign in the valleys of Caplina and Sama, which are close to their frontiers. A meeting of the three ministers of health some time this year was recommended in order to adapt the agreements of the three countries to the main lines of the international sanitary code.

It is planned that the next meeting will be held in La Paz, April 7, 1953, after a preliminary meeting in Tacna (Perú). Trypanosomiasis American (Chagas disease) has been included as one of the subjects for discussion for the coming meeting along with the diseases already mentioned. Finally, it was suggested that rabies be studied as a public health menace in each country. Depending on the findings, rabies may be considered as another subject for discussion.

The items in these letters are contributed by regular correspondents in the various foreign countries.

ITALY

Vertebral Fracture Caused by Electric Shock Therapy.—At a meeting of the Italian Society of Neurology, held in Volterra under the chairmanship of Professor Zalla, Dr. Mugnai called attention to the danger of electric shock therapy, stressing vertebral fracture, which is not sufficiently emphasized in Italian literature. On the basis of the one case that he observed and of foreign statistics, he advocated a systematic roentgenographic investigation of the spinal cord in patients treated with electric shock therapy, so that the rate of spine complications in this method of treatment can be established. His report resulted in an important discussion in which many physicians attending the meeting participated.

Professor Sarteschi, from Pisa, asserted that in his clinic, during a five year period, fractures were rare; there was only one fracture in 30,000 electric shock treatments. He concluded that it is not advisable to repeat electric shock treatment in patients in whom a vertebral fracture has occurred. Professor Ferrari, from Genoa, observed only a few vertebral fractures during electric shock therapy in the neurological clinic of Genoa. He concluded that such low numbers, in opposition to the foreign statistics, do not justify, from his point of view, the omission of electric shock therapy when it is indicated; only when extensive and evident alterations are shown by roentgenograms should this treatment be omitted. Professor Sarteschi, from Volterra, never observed vertebral fractures in the many thousands of electric shocks performed at his hospital. In his patients, he observed fractures and dislocations of the upper extremities. Professor Salotti, a radiologist from Florence, said that a preventive radiological investigation of the spinal cord is useful as a guide, but it should never constitute a factor influencing the omission of electric shock therapy.

Society of Medical Culture.—At a meeting of the Society of Medical Culture of Novara, held under the chairmanship of Professor Vittorio Leigheb, Drs. Ferrero and Bossi discussed a case of thrombosis of the left common carotid artery in a 50-year-old man in whom arterial pressure was normal and who, for three months, had had right side hemiplegia and atoxic aphasia of gradual onset. Encephalography according to Bingel's method revealed a left ventricular block, and further investigations revealed thrombosis of the left common carotid artery. The case presented some peculiar neurological aspects, especially the impossibility of performing arteriography of the left carotid artery, whereas, as a rule, thrombosis of the internal carotid artery is more frequent and can be detected by arteriography. The patient was operated on; the occluded portion of the carotid artery was opened; and a long thrombus was removed. A late but obvious improvement in the patient's neurological condition was observed.

Drs. Martelli and Pisani reported the case of a 57-year-old patient who was admitted to the hospital with Jacksonian attacks in the right side of the body. Encephalography revealed a slight, symmetrical hydrocephalus, whereas the roentgenographic examination of the skull revealed prominence of the diploic vessels of the left side, caused by an angioma of the left cerebral hemisphere. After roentgen therapy to the affected area, the Jacksonian attacks disappeared for about one year and then reappeared but with intervals between attacks longer than the previous ones. After many months, the patient was readmitted to the hospital with severe subarachnoid hemorrhage. Angiography of the carotid artery, performed immediately after the attack, revealed an excessively large angiomatous process that had developed mainly in the left temporoparietal region. Because of the enormous size of the angioma and its localization on the left side, an operation was not performed. It was revealed that when he was 12 years old, the patient had suffered an injury in the left parietal region that had resulted in right side hemiplegia of short duration. About 10 years after the injury, the first Jacksonian attacks were observed. According to the speakers,

the trauma was responsible for the angioma, although, as a rule, this morbid entity is considered to be congenital.

Dr. Menapace discussed diphtheria, with special reference to the changes brought about by vaccination with toxoid. Diphtheria is a common disease in Italy, and its gravity is more pronounced than other infectious diseases. The study of its epidemiology shows a characteristic seasonal course with the peak in the fall. On the basis of a statistical study of 2,378 patients with diphtheria admitted to the hospital of Novara from 1943 to 1946, the speaker observed that the war brought great changes in the epidemiology of diphtheria, and this makes it difficult to judge the usefulness of vaccination with toxoid. This was seen by comparing these data with data for an equal length of time before 1939. The increased incidence among adults is certainly caused by changes brought about by the war.

LONDON

Voluntary Service and the State.—The National Council of Social Service and the King Edward's Hospital Fund for London has just published a report entitled "Voluntary Service and The State," which summarizes the results of an inquiry carried out for "the future of voluntary service in the new hospital service." The report is divided in three sections: (1) voluntary service in hospital administration; (2) voluntary service to the sick and infirm; and (3) voluntary funds. The present organization of the national hospital service in England and Wales provides for the country being divided in 14 regions, each containing a university medical school and administered by a regional hospital board. The chairman and members of these boards are directly appointed by the minister of health, who, in making the appointments, is required to consult various bodies, including local authorities and representatives of the former voluntary hospitals, the universities, and the medical profession. Within each region the hospitals are divided into conveniently administered groups, each of which is administered by a hospital management committee, of which there total 378. The chairman and members of these hospital management committees are appointed by the regional hospital boards. The teaching hospitals are grouped separately, and each teaching hospital group (of which there are 24 in London and 12 in the provinces) is administered by a board of governors, the chairman of which is appointed by the minister of health.

The authors of the report are convinced that the maintenance of voluntary service is essential to the success of the National Health Service. "The committees of this country are democracy at work. . . . Committee administration may be cumbersome and slow, but it is an effective barrier to tyranny, not only the tyranny of totalitarianism but also the lesser tyranny of bureaucracy." Two conditions are essential to the successful operation of the new hospital service. One is that the minister of health shall trust the regional hospital boards and hospital management committees. The other is that "these Boards and Committees shall undertake their work with a clear appreciation of their relative functions and with a full sense of responsibility." It is pointed out that although the original intention of the minister was clear, that the regional hospital boards should "guide and control the planning, conduct and development of the services in their area," the tendency has been for the boards to become "primarily administrative bodies standing between the Ministry and the Management Committee and exercising functions which appear to exceed those of an overseer." This tendency is strongly deprecated. "The greatest danger" to the success of the service is "the tendency of the central authority to regard the voluntary boards and committees not as partners with them in the administration of the service but as their unpaid servants." The relationship of principal and agent is very different from the relationship of master and servant, and the administration can be effective only if the voluntary partners are allowed and encouraged to have wills of their own and a substantial measure of individual authority. The difficulties involved in reconciling central direction with decentralized executive authority are fully appreciated. Superficially there is much to be said in favor of paid officials as opposed to committees, but "a committee can provide a consensus of opinion, perspective and objectivity, all of which are of value. It also provides a safeguard against the ill-effects of bureaucratic control: this would become increasingly important since experience seems to indicate that an increase in public administration tends to produce an officiousness in minor office and some decline in courtesy to the public."

The section on voluntary service to the sick and infirm provides a full review of the present scope of such service. It is pointed out that when the National Health Service was introduced in 1948 there was an immediate decline in the amount of voluntary service. It was soon realized, however, that such service was still required. Indeed, the report states that "at the present time, although there is a national health service financed almost entirely from public funds, there is more voluntary service given to the sick and infirm than ever before." In hospitals for the acutely sick these activities include auxiliary nurses, ward orderlies, the repairing of hospital linen and patients' clothing, visiting of patients, and advice to patients on legal and financial matters. Then there are portable stores from which patients can purchase things, library services, and entertainments. A specialized form of voluntary service, which has become of increasing importance during recent years, is in connection with the blood transfusion service, where the services provided include recruiting donors, managing publicity, enrolling donors, preparing for bleeding sessions, serving meals to staff and tea to donors, and assisting with clerical work.

All these services in hospitals for the acutely sick are also available in hospitals for the chronically sick, but there the problems involved are more complex and the demand for voluntary services more adamant, because in the past they have been relatively neglected. Many of the problems involved are concerned with geriatrics. Part of the difficulty is the dismal and depressing condition of many of the buildings in which such hospitals are housed. Thus, valuable voluntary services in this type of hospital include reading to partially blind patients, helping to feed those who have difficulty in feeding themselves, and arranging outings for those who are able to leave the hospital for a few hours.

Tuberculosis hospitals and sanatoriums present similar opportunities for voluntary service. An interesting example of what can be done in this connection is the "Friends of Kelling." This is an organization founded in 1948 by three patients after being discharged from Kelling Sanatorium in Norfolk. The aim of the organization is "to mobilise, encourage, foster and maintain the interest of the public in the patients of Kelling Sanatoria and the support of the work of the Sanatoria by voluntary service." Each year an entire week is devoted to raising money for the purpose. The full support of the sanatorium staff, the management committee, and the local community has been obtained, and the amenities provided include a film projector, toys for the children, competitions, entertainments, and garden parties. In the words of the report, "all these activities have brought the outside world into the hospital and have given the patients constant friendship and interest, and zest for living."

Voluntary services outside the hospitals are equally comprehensive. They include home helps, "sitter-ups," transport for patients and relatives to and from the hospital, mobile kitchens, mobile physiotherapy units to make physiotherapy available to patients in outlying districts who would be unable to get to a hospital for such treatment, and "Darby and Joan" clubs for old people. In addition, many of the convalescent homes of the country are run by voluntary societies.

Two specialized forms of voluntary service outside the hospital are worthy of fuller notice. One is the "Scunthorpe Remedial Recreational Club" in Lincolnshire, which was founded by the orthopedic surgeon and the almoner at Scunthorpe Hospital, for "the resocialisation of the sick and injured by the activities of a club of which they hold temporary membership." The club has a membership of about 50 children and adults of whom one-half have had poliomyelitis. The club meets twice weekly, once in a gymnasium and once at the local swimming bath. In this way the members are rehabilitated physically, mentally, and socially, and here become more easily adjusted to normal living conditions. Temporary membership is insisted

upon, no matter how long the period of disability, as the prime aim of the club is to be "a bridge between the hospital environment and normal society."

The other is the "Chesire Foundation Home for the Sick," so-named after the "flying ace" of World War II who founded it to provide "a home for sick people for whose special needs the national health service could not provide, and who had nowhere else to go." The original home was in Hampshire; it housed 32 patients, whose ages ranged from 18 to 92. A second home has been opened in Cornwall. The only patients excluded are those with tuberculosis. The home is intended to be similar to a family home, and both staff and patients live a community life, helping each other to the best of their ability. It is believed to be "the only home that provides for the young chronic sick the opportunity to lead as normal life as they are able to lead, with all the nursing care that they need." Patients pay fees, but these cover only a fraction of the cost of running the home.

The main conclusions of the report are epitomized in the following quotations: "The partnership of the State and voluntary service in the administration of hospitals is, in our view, a courageous and imaginative experiment. . . . There is no doubt in our minds that voluntary service in the hospital, and to the sick and infirm outside the hospital, must continue and must be expanded. . . . We believe that the "voluntary spirit" that inspires voluntary service is something that is of the essence of greatness in man, and that a nation that fails to make use of this gift can never be a great nation."

PARIS

Conference on BCG.—On Dec. 8, 1951, the French Society for Tuberculosis organized a special conference on BCG. Dr. Courcoux, chief editor of the *Journal of the French Society for Tuberculosis* and Drs. Duret, Choubrac, and Le Menager cited two comparative sets of statistics on the pupils at a school for health visitors, especially in regard to exposure to tuberculosis. Of 88 allergic pupils not vaccinated from 1935 to 1942, 23 had tubercular manifestations, of which 3 were fatal; of 155 pupils, anergic but vaccinated, from 1943 to 1951, only 1 had pleurisy. Drs. Fourestier, Baïssette, Bergeron, and Gonzalès stated the results of vaccination in the town of Montreuil (near Paris). In this city, primary infection showed a decrease from 5.5% in 1948 to 2.73% in 1950, for persons from 0 to 19 years old. In the suburbs of this city, where no BCG vaccinations were given, primary infection increased from 6.03% in 1948 to 14.08% in 1950. In Montreuil, the tuberculosis chart (not including primary infection) of persons in the same age group showed a decrease from 1.13 to 0.97% from 1948 to 1950. Professors Gernez-Rieux, Gervous, Ramon, and Jacquet (Lille) stated the results obtained in vaccinating 15,000 children in the northern district since 1947. The authors insisted that fresh vaccines yielded the same results as dried ones. A comparison between 6,920 persons vaccinated more than two years ago and a control group of 2,130 persons who had negative skin tests in 1949 and who had not been vaccinated showed a pleurisy incidence of 0.57 per 1,000 in vaccinated persons in contrast to 1.40 per 1,000 in the control group. There were enlarged hilar nodes in 0.43 per 1,000 of vaccinated persons in contrast to 10.32 per 1,000 in the control group. In regard to BCG, the authors recommended the scarification process for very young persons and intradermal vaccination for adolescents and adults. Drs. Dufour and Despierres (Lyons) emphasized the risk incurred in vaccinating persons a short time after primary infection and the absolute necessity of isolating, before vaccination, persons who were in contact with others with positive sputa. Maclouf (Paris) explained that the administration of BCG in aerosols allows a large dispersion of the vaccine and thus avoids the concentration of bacilli at a single point. It is interesting to note that anergic adolescents vaccinated with this method had no local or general reactions; on the other hand, the operator experienced allergic reactions for a long time. He had a high temperature, vomiting, and headache, and density at the apex of the right field was found at radiography; this disappeared after rest.

SWEDEN

The Prognosis for Cancer of the Breast.—Figures recently quoted by Dr. Hugo Rosenqvist show the approximate survival-rate for patients with various types of cancer of the breast, who undergo radiological and operative treatment as practiced at Radiumhemmet and the Caroline Hospital (Karolinska Sjukhuset) in Stockholm. Of 1,014 patients treated at these hospitals, 80% could be regarded as operable. The survival-rate after five years was 79.1% for the 418 patients with cases in stage 1 and 46.4% for the 539 patients with cases in stage 2. The survival-rate for the two stages together was 60.5%. It should be noted that stage 2 included the patients in whom there were metastases to the axilla at the time of operation. Included among the 1,014 cases were 57 that were so advanced that they had to be relegated to stage 3. They were, however, given operative treatment for various reasons. Most of these 57 cases terminated fatally within three years.

Dr. Rosenqvist calculates that 1,700 patients with cancer of the breast are operated on every year in Sweden. He also calculates that, considering how many cases are inoperable from the outset, about 1,000 women die every year of cancer of the breast in Sweden. Yet there has been considerable improvement with regard to the early recognition of the disease. It was shown by Dr. Nyström in 1922, that 30% of the patients consulting a physician for cancer of the breast did so within six months after suspecting it. This rate has risen to 70%. Even so, only about one-third of the cases discovered at present show no signs of metastases. Recent dissections of the intercostal spaces showed that metastases to the parasternal glands occur earlier than was thought. This process is favored by the location of the cancer near the midline, a fact that helps explain why the prognosis is worse for the median cancers than for the lateral cancers of the breast. These dissections proved that invasion of the supraclavicular fossa by metastases often occurred before involvement of the glands in this area was clinically demonstrable. As judged by the findings of these dissections, 15% of the cases hitherto regarded as belonging to stage 1 and 40% to stage 2 really belong to stage 3 and by the same token should be regarded as inoperable. In discussing exploratory excisions when in doubt, Dr. Rosenqvist argues in favor of them as an indispensable aid to early diagnosis.

Lessons from Mass Radiography.—A mass radiography campaign conducted in the town of Norrköping in 1947 and 1948 has yielded some valuable information, which has been collected and sifted by Dr. Ragnar Frölinder for the benefit of other workers in this field. Everyone in the town over 7 years of age was invited to undergo a radiographic examination, and over 61,000 persons accepted this invitation. There were, however, between 7,000 and 8,000 persons, who, for various valid reasons, were exempted from this examination, and there were 2,972 who absented themselves for unknown reasons. There was refusal to participate in this examination of 0.9% of the total. The most wholehearted support of the campaign came from the large industrial concerns and public services, whereas persons working at home and members of the upper classes were less inclined to respond. Although there was a majority of women in the town, there were 2,000 fewer women than men undergoing this examination. It seems that the woman working at home was the least likely to be interested in the examination.

It is usually assumed that persons with cases of tuberculosis discovered by mass radiography often come from homes with a family history of tuberculosis. But in this instance, as many as 120 of 151 persons with definite pulmonary tuberculosis were found to belong to families in which tuberculosis had hitherto been unknown. Dr. Frölinder compared the number of new cases of pulmonary tuberculosis notified year by year before this campaign with the number of cases notified after it. During the years 1942 to 1946, there was an average of 100 such new cases yearly. After this campaign, only 37 new cases were notified in 1949. In 1950, there were 57 such cases, and, in 1951, there were 60 such cases. It seems that the effect of mass radiography dwindles with the lapse of time following it.

CORRESPONDENCE

DOCTORS' ART SHOW CANCELLED

To the Editor:—Through factors beyond their control—mostly financial, owing to lack of a sponsor this year—the board of directors of the American Physicians Art Association have decided to cancel the A. P. A. A. art show in Chicago and plan for a big show in New York the following year.

Because of this cancellation, I deeply regret we will not be able to hold an art banquet next June. I hope you will understand the predicament in which the A. P. A. A. is placed without a sponsor to help meet our expenses so that we are forced to cancel our art activities at the next A. M. A. convention.

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OLD TERMS AND MODERN CONCEPTS IN MEDICINE

To the Editor:—Because terms reflect concepts, there is a danger that the persistence of obsolete terms in our language may perpetuate outworn concepts. Among such terms are some that imply a categorical distinction no longer considered valid, as, for example, "functional etiology" versus "organic etiology," "functional process" versus "organic process," or "functional disease" versus "organic disease."

According to older concepts, a disease is organic, anatomic, or structural, if a gross or microscopic "lesion" can be identified by visual methods of examination. Today there is a general awareness that most anatomic lesions depend upon a series of functional changes. The diphtheritic membrane, for example, which chokes its victim, is composed chiefly of the victim's own fibrin. The consolidation in the lungs of the patient with pneumonia comes from his own body's reactions to the invading microbe, which include vasodilation, exudation, and the mobilization and concentration of leukocytes. These changes do not represent the depredations of the pneumococcus so much as they reflect functional adaptations by the host. Similarly, the manifestations of many other diseases stem from the patient's own adaptive processes. Hence the terms functional and structural are descriptive of different phases in a process and do not imply that the bodily disorders are categorically different.

Such phrases as "the effect of the mind on the body" and "emotional origin" are similarly inexact and misleading, since not only intangible stresses but many of the tangible ones produce their bodily effects or diseases through the mediation of the highest levels of the central nervous system. Thus the nausea that follows a whiff of rotten egg vapor must be brought about through pathways in the forebrain. This would not be referred to as "the effect of the mind on the body." It is rather the effect of the rotten egg on the body. Since bodily mechanisms that require the presence of the cerebral cortex are functions integrated at the highest neural levels, the phrase "highly integrated response" may be more useful and is certainly more meaningful than the oft heard "psychogenic reaction."

One may thus think of highly integrated functions in the same biologic terms with which one considers more localized reactions and responses on a segmental reflex level. Recent studies have emphasized the fact that a variety of stressful experiences may be damaging to the human organism, some of the noxious stimuli acting more or less directly, others largely indirectly. When stressful qualities of an experience depend upon its significance to the individual, the reaction is mediated through the highest (cortical) level. Such a process of work by the neurons in the brain is certainly as physical as the manufacture of urine by the kidneys.

Recent work suggests that certain bodily disorders and diseases may include in their mechanism the interpretive function of the brain. Study of such highly integrated patterns of reaction in man requires a comprehensive view of the human organism and its aims and goals. This type of study has not been popular; recently, in fact, it has been considered in some quarters to be unscientific. To call this unscientific would be the same as saying that a study of water and its properties would be less scientific than a study of the constituents, hydrogen and oxygen. To such early physiologists as Claude Bernard, it was scientific and highly desirable, and Bernard found it possible to focus his interest on a study of the behavior and habits of highly differentiated man. Shortly thereafter, the discoveries of Louis Pasteur at once widened and narrowed the horizon of investigators. Bernard predicted that the best brains in medicine would become diverted to the study of the behavior and habits of the not very highly differentiated bacteria. This trend took place and was followed in the history of medicine by the work of such great German physiologists as Karl Ludwig on the functions of isolated organs. Even in the recent past an experimental study was considered most highly satisfactory if the organ in question could be isolated almost completely from the influence of the organism's highest integrative activity. One might as well approach the study of water by isolating and scrutinizing hydrogen. Consistent progress in medicine today depends, as always, on changing methods and concepts, and clarity of thinking requires that worn out concepts be discarded together with the clichés that serve them. The breadth of view necessary to progress in medicine involves not only the consideration of the whole patient but the development of the "whole doctor."

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LYSOZYME AND ULCERATIVE COLITIS

To the Editor:—A letter published in The Journal, March 29, 1952, on lysozyme and ulcerative colitis aroused my interest. I agree with the author in that lysozyme probably does not play an etiologically significant role in ulcerative colitis; however, this assumption has not yet been conclusively demonstrated. The results obtained in the cauterization experiments lack statistical significance with respect to increased lysozyme titers. Further, the method used to determine lysozyme in these cauterization experiments as well as in most lysozyme studies of ulcerative colitis employs arbitrary lysozyme units varying in definition from investigator to investigator. A comparison of results between different laboratories is impossible. The method used is indicative of a rather wide range in the amount of lysozyme present. It would have been far better to measure lysozyme quantitatively in metric units (micrograms) as is accomplished by the method of Smolelis and Hartsell (*J. Bact.* **58:**732, 1949) modified by Lobstein and Fogelson for gastric contents (*Quart. Bull., Northwestern Univ. M. School* **25:**89, 1951; *Am. J. Digest Dis.* **18:**298, 1951) and for whole blood (Lobstein, Ross, and Fogelson, to be published). I wish to add that lysozyme does not seem to play an etiologically significant role in peptic ulcer either (Lobstein, Hull, and Fogelson, *Gastroenterology* **20:**474, 1952).

May I also remind the reader, first, that crystalline egg-white lysozyme, the lysozyme from cauterized animals, and the lysozyme of excreta in ulcerative colitis are not necessarily identical, and, second, that what happens in animals need not happen in man. It is well known that dogs are quite different from man with respect to resistance of the gastrointestinal tract to ulcerations and that the composition of the secretions of the gastrointestinal tract is also different. What appears to be normal or low in animals may be high for man or vice versa. It is therefore misleading to make such comparisons.

Experiments performed in this laboratory on dogs with total colon pouches (unpublished data, 1950), in which these pouches were transfused with (1) solutions of crystalline egg-white ly-

sozyme, and (2) the "lysozyme" active fractions of stools from human ulcerative colitis patients, all gave negative results. Neither series produced any pathologically demonstrable lesions, but it would have been erroneous to conclude that similar experiments in man would have given similar results.

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ADDISON'S DISEASE DUE TO METASTATIC BRONCHOGENIC CARCINOMA

To the Editor:—In their article on Addison's Disease in bronchogenic carcinoma published in The Journal, March 1, page 729, Drs. Wallach and Scharfman stated that they failed to find in American literature "any confirmed case report of Addison's disease due to replacement of adrenal tissue by tumor." A case of this kind was reported by me in my monograph on primary carcinoma of the lungs published in 1932 and later in my book on bronchogenic carcinoma and adenoma published in 1948. It concerned a man of 53 whose illness of about two years' duration was characterized by steady loss of weight, asthenia, anorexia, hypotension, and pigmentation of the skin and mucosa of the roof of the mouth. On a few occasions he was disoriented. Members of the hospital staff who were familiar with the silent or inapparent type of bronchogenic cancer keenly searched the lungs to no avail. The physical examination, except for a nontender tumefaction in the region of the left kidney, was normal, as was the roentgen ray study. The clinical diagnosis was Addison's disease.

At the postmortem examination, a minute bronchial cancer, at first overlooked, was disclosed when it became apparent that both adrenals had been destroyed by cancer and not by tuberculosis.

With the frequency of metastases to the adrenals from a bronchogenic cancer there is little doubt that the incidence of Addison's syndrome caused by a neoplastic metastasis is less rare than physicians would have us believe. It is overlooked because attention is directed to the pulmonary cancer, which is considered accountable for the symptoms.

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DRUG RESISTANT TUBERCLE BACILLI FROM PATIENTS TREATED WITH ISONICOTINIC ACID HYDRAZIDES

To the Editor:—Many glowing reports of the early beneficial effects of the isonicotinic acid hydrazides ("rimifon," "nydrazid," and "marsilid") in patients with tuberculosis have appeared in newspapers and magazines as well as in the medical journals. Little has been mentioned, however, about the emergence of drug resistant tubercle bacilli in the sputum of patients treated with these drugs. Since one of the major drawbacks to the use of streptomycin alone in pulmonary tuberculosis proved to be the rapid emergence of streptomycin resistant strains of tubercle bacilli, and this regardless of the dosage, it is important to determine as soon as possible whether the same situation will arise during therapy with the isonicotinic acid hydrazides.

Six patients began to receive isonicotinic acid hydrazide ("rimifon") or its isopropyl derivative ("marsilid") on Jan. 18, 1952. All had chronic cavitary pulmonary tuberculosis that had not responded satisfactorily to previous treatment, including streptomycin and *p*-aminosalicylic acid. Weekly 72 hour sputum samples were digested with sodium hydroxide and concentrated, and from this material Gaffky counts and cultures for isonicotinic acid hydrazide sensitivity were made. Definite evidence of increased bacillary resistance was noted in three of the six patients after seven weeks of treatment. In one patient, the first indication of increasing resistance was apparent after 26 days. An initial fall in the Gaffky count of these three patients was followed by a rise at a time corresponding closely to the onset of increased bacillary resistance. After 11 weeks of treatment these three patients, as well as a fourth whose cultures have not as yet shown any resistance, show sputum bacillary counts as high or higher than when they began treatment. Just prior to treatment, one patient had negative sputum smears and cultures despite the presence of pulmonary cavitation. After six weeks of "marsilid" therapy a positive culture was obtained, and the recovered bacilli showed a resistance to "marsilid" greater than that of any pretreatment culture so far tested. In only one of the six patients has the sputum converted to negative by culture.

Thus it is apparent that drug resistant strains of tubercle bacilli may emerge rapidly in patients with chronic pulmonary cavitary tuberculosis during therapy with the isonicotinic acid hydrazides and that the appearance of such strains may be followed closely by bacteriologic relapse. In the light of these observations it may be predicted that the use of these drugs alone in patients with this type of disease may result in only temporary benefit, and that, if isonicotinic acid hydrazide resistance proves to be long-lasting, it may prejudice the chance of future response to therapy with a combination of isonicotinic acid hydrazide and another drug, or surgical procedure, or both. The observations referred to in this letter will be published in detail in the near future.

Further investigation should logically proceed along the line of a search for methods to delay or prevent the emergence of resistant organisms.

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TRANSMISSION OF LEUKEMIC AGENT FROM PARENTS TO OFFSPRING IN MICE

To the Editor:—In describing the results of recent studies on mouse leukemia carried out in this laboratory (*J. A. M. A.* **148:**746 [March 1] 1952) experiments referring to the transmission of the leukemic agent from parents to offspring were designated as "tests . . . of the possibility of transplacental transmission of the leukemic agent." This statement referred to a series of experiments in which, as a result of the inoculation of the leukemic agent into suckling infant mice of a nonleukemic line, in not only the inoculated animals did leukemia develop but later on also in 48% of their untreated offspring (Gross, L.: *Proc. Soc. Exper. Biol. & Med.* **78:**342, 1951). These experiments suggest that the leukemic agent is transmitted from the inoculated parents to their offspring; the question remains open, however, how such transmission may occur.

The possibility of transmission of the leukemic agent from mothers to their offspring through the milk has been excluded by experiments demonstrating that foster nursing did not prevent the development of leukemia in mice of a leukemic inbred line (MacDowell, E. C., and Richter, M. N.: *Arch. Path.* **20:**709 [Nov.] 1935). Transplacental transmission, however, is not the only remaining explanation to be considered; it is also possible to assume that the leukemic agent may be passed from one generation to another directly through the germinal cells, i. e., through the fertilized ovum.

Current experiments carried out in this laboratory suggest that the leukemic agent is present in normal testicular tissue as well as in normal ovaries of young healthy mice of the leukemic Ak line. The possibility must therefore be considered that in mice of the leukemic strain the sperm as well as the ovum may contain the leukemic agent and may carry it directly into the fetus. The embryo developing from such an infected ovum may thus carry the leukemic agent from the time of conception, as in the case of chicken lymphomatosis.

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COUNCIL ON MEDICAL SERVICE

MEDICAL CARE FOR THE INDIGENT

A little over a year ago the Committee on Indigent Care [1] of the Council on Medical Service undertook two projects. The first was a general survey of the status of medical care programs for the indigent and medically indigent in the United States. The second consisted of specific studies of a limited number of state and local programs.

GENERAL SURVEY

The purpose of the general survey was to provide the committee with an over-all view of the various types of medical care programs now in operation, to show something of the variations in approaches to this problem, and to discover to what extent medical societies officially participate in such programs.

Questionnaires were sent to all state medical associations and to 125 local medical societies. A summary of such programs in the 48 states reveals that in 31 states the medical care of the indigent is a county, municipality, or township responsibility and that 14 states have what might be considered statewide programs. Most of these, however, are administered locally.

The survey indicates that there are few organized medical care programs for the indigent and medically indigent. State governments generally limit their efforts in this field to defining indigency, to authorizing local governmental units to care for the indigent, and to participating in financing the care of special public assistance groups. Despite the increased emphasis on so-called social security, the free services of family physicians and of hospital staff members are still the principal source of medical care for this group of persons.

Hospital care is generally available to both the indigent and the medically indigent in government hospitals, in hospitals affiliated with teaching centers and, of course, in many private hospitals. Surgery and in-hospital medical care are equally available, with physicians usually giving freely of their services as staff members. Little effort seems to be made to allow a free choice of physician.

Specialists' services are generally available to the indigent, and to a lesser degree to the medically indigent, in outpatient clinics of many hospitals and in special clinics operated by health departments. Here, again, there is little free choice of physician, with the physicians providing their services gratis or at a small retainer or hourly rate.

Few programs specifically provide home and office care for the indigent. In any event physicians often give their services to individual patients without compensation. Where such programs do exist, it is frequently the medical society that has promoted the idea and is making the program work. A number of county societies contract with the county officials for the services of the society members; others provide a panel of names from which the client may select a physician. Several societies administer the entire program; others act only in an advisory capacity.

From the data collected to date it is evident that medical societies, both state and county, must interest themselves in this problem. Adequate home and office care programs have been developed only where the medical societies have actively participated in the planning and operation.

THE SPECIFIC STUDIES

On completion of the general survey the committee undertook a series of specific studies of various types of indigent medical care programs. For this purpose 12 communities and 4 states have been selected, each with a different kind of program. The primary interests of the committee are the types and number of medical services available to indigent persons and the degree of physician participation in such programs. Consequently, the studies have been directed toward obtaining information and data that will enable the committee to evaluate the programs and to make recommendations as to medical society participation.

The studies are concerned with two general groups of persons: (1) those on general assistance programs, including the relief and medically indigent, and (2) those on public assistance programs, including the old age pensioners, the dependent children, the blind, and the permanently and totally disabled.

General Assistance.—Although social welfare laws differ greatly from state to state, the development of these laws seems to have a common background. They were developed to provide the basic necessities of life to persons not able to support themselves. These persons are referred to by a variety of terms, such as general assistance cases, relief cases, or just the indigent. Few state or city laws demanded the inclusion of medical care in the subsistence benefits for this group, and it has been through "interpretation" that medical service has become and is now generally included as one of the basic necessities.

Along with this provision of subsistence and medical care for relief cases it became apparent that many persons could maintain themselves as long as no sickness developed in the family. In other words, these persons could provide the basic necessities for their own subsistence, with the exception of medical care, and are known as the "medically indigent." These two groups comprise the general assistance cases and are accepted as the responsibility of local governments.

Public Assistance.—Over the years a number of states created special programs to meet the needs of particular groups such as the blind, the aged, and children. These special programs were given impetus by the federal government in 1935 through the Social Security Act. This act created three categories for which federal funds would be available to states, provided the states complied with such federal regulations as were set forth. The three categories or groups are: old age assistance, aid to dependent children, and aid to the blind. In 1949 a fourth group was added under the title, aid to the permanently and totally disabled. Persons who fall within these four groups or categories are referred to as public assistance cases, as opposed to the relief or general assistance cases. The costs of public assistance are shared by the local, state, and federal governments, while costs of general assistance are local or local-state shared.

Old age assistance can be granted to persons 65 years of age or older who are in need. The amount they receive and the determination of a person's eligibility rests with the state as it does in all the categories. Aid to Dependent Children provides aid to children under 16 years of age or up to 18 years of age, if they are in school. These are children who are orphaned or otherwise lose parental support and are living with relatives or legal guardians. Funds are granted to the guardians of these children. To receive assistance under the aid of the blind category, a person must have not better than 10% of normal vision corrected. This is the smallest category numerically. The permanently and totally disabled category provides aid for those who cannot support themselves because of physical incapabilities that are permanent in nature.

The federal share for old age assistance, aid to the blind, and permanently and totally disabled is four-fifths of the first $25 of the state's average monthly payment, plus one-half of the next $10, plus one-third of the remainder, with a maximum of $50 on each category. This means a state would be reimbursed $30 from the federal government for a $50 allotment check to persons receiving old age assistance or aid to the blind, or to permanently and totally disabled clients. Administrative costs are shared equally by state and federal governments.

In aid to dependent children cases, the federal government will share three-fourths of the first $12 and one-half of the remainder, with a maximum of $27 per first child per month. An $18 maximum is imposed on subsequent children in the same house. Administrative costs are also shared equally by state and federal governments for this category.

A major change made in social security administration by the 1949 amendment involves the method of payment for services. Originally, no federal funds could be used to pay physicians or

1. Committee members: Drs. H. B. Mulholland, Chairman, Charlottesville, Va.; A. J. Bowles, Seattle; E. P. Coleman, Canton, Ill.; J. H. Howard, Bridgeport, Conn.; E. A. Ockuly, Toledo, Ohio; Dean W. Roberts, Baltimore; and Roscoe C. Webb, Minneapolis.

hospitals directly for care of persons on one of the public assistance programs. All federal monies had to be paid to the public assistance client. At present, however, the states may pay the vendor of medical service directly and still receive federal matching.

In review, the four categories receiving aid with federal monetary support are old age assistance (O. A. A.), aid to dependent children (A. D. C.), aid to the blind (A. B.), and aid to the permanently and totally disabled (P. T. D.). These four groups make up the public assistance categorical cases. The two groups supported primarily from local funds are the relief and medically indigent cases and are to be termed general assistance cases. These terms and abbreviations will be used in the reports on indigent programs reported on here and in subsequent issues of THE JOURNAL.

INDIGENT MEDICAL CARE IN ERIE COUNTY (BUFFALO) NEW YORK

This report will consider Erie County, New York, as the study unit. The population of Erie County is approximately 800,000, of which 575,000 persons are in the city of Buffalo. Erie County is chiefly an industrial area, with both light and heavy industry well represented. Farming is also a source of wealth for the county but comparatively few of the county's population are thus employed.

ELIGIBLE POPULATION

Approximately 16,770 persons in Erie County, or about 2% of the population, receive aid during the average month under one or more of the public assistance or general assistance programs. The number of persons in each program is as follows:

General assistance and medically indigent	5,300
Public assistance	
Old age assistance	6,100
Aid to dependent children	3,200
Aid to blind	170
Permanently and totally disabled	900
Crippled children	1,100

All of the above groups are eligible for the same medical care benefits. Certification as to eligibility for medical care is handled by the department of social welfare, with each case investigated to determine the program for which the person qualifies. Each case worker is assigned to a given geographical area and serves all programs. Once eligibility for care under one of the programs is determined, it is maintained as part of a continuing process under regular case worker supervision.

ADMINISTRATION

The board of supervisors of Erie County, an elected body, appoints a board of social welfare. This board, in turn, appoints a commissioner of welfare to head the department of social welfare, the agency responsible at the county level for all persons receiving aid under any program. This department determines eligibility and does the planning for all clients, subject to approval by the state department of social welfare.

Within the county society welfare department is a medical division headed by a full-time physician and employing seven part-time physicians. It is the function of this division to check all bills and to review the diagnoses and therapy connected with the bills. The medical division also reviews each special procedure to ascertain its advisability. In addition to the review of bills and treatment, provision is made for remedying any abuses that may be found. In case of abuse, the physician or client is notified, depending on which of the two is at fault, and the matter is usually settled within the medical division. If a client is not satisfied with the decision, he has a right to appeal to the state board of welfare for a "fair hearing," as provided under federal law. The physician, in turn, may appeal to the medical director or to the county medical society.

The department of social welfare also has a hospital division, which investigates and arranges hospitalization for nonrelief (medically indigent) cases, as well as a dental division, responsible for arranging for dental care. Hospitalization of active relief cases is under the direction of the individual relief units.

SERVICES AVAILABLE

All health services are potentially available to anyone on any of the programs. Each person is treated according to his needs, whether his is an aid to the blind case or a medical relief case. Furthermore, there is no time lag between the request and receipt of most services.

Home and office calls by physicians are on a free choice basis; however, even though office calls are allowed, clients are urged to use the clinic services whenever possible. In emergencies a client calls a physician and identifies himself as an aid case. The physician is free to accept or refuse the case. If the client has difficulty in getting a physician or if he knows of no physician to call, he may contact his case worker, who will provide a list of four or five physicians.

Although the county maintains its own hospital, all clients have a free choice of hospital and may have their own physician attend them during their hospital stay. The need for hospitalization in emergencies is determined by the attending physician, and the patient may go to the hospital immediately. In cases that do not constitute emergencies, application is made through the medical division.

Outpatient care is available in the nine general hospital clinics to persons on any program. These clinics are partially supported by the county board of supervisors; therefore, when clients use them, the costs are not charged to the social welfare department's budget. Physiotherapy is available at any time in the outpatient clinics and with special permission may be obtained in a private physician's office. Nursing care in the home is available for all clients through the Visiting Nurses Association but must be authorized by the medical division.

Drugs requiring prescriptions may be obtained at the pharmacy of choice, provided they do not exceed $5.00; if they cost over $5.00 the physician writing the prescription must receive prior authorization from the social welfare department. In emergencies, physicians are expected to provide such medicines as are necessary from their medicine bags.

Diagnostic laboratory services are available in the Erie County Laboratory and may be used by any physician. The laboratory is located in the E. J. Meyer Memorial Hospital and does the clinical and pathological studies for the hospital.

Convalescent care is provided in private nursing homes and in the County convalescent home. Eyeglasses are provided on prescription of a specialist. Special appliances are also supplied when prescribed by a physician and approved by the medical division. Ambulance service is maintained and provided by the various hospitals as a part of their regular services. Clients are entitled to a choice of dentists, or they may go to dental units in the outpatient departments of the hospitals. An official health education program is operated by the health department of Erie, and both preventive medicine and health education are emphasized by the case workers.

Prior authorization, which means being enrolled on an aid program, is necessary for the benefits described. If a person who is not on one of the programs needs a physician and is given service, the physician must collect from the patient or assume the loss. There is no provision for reimbursing the physician who cares for a private patient who is unable to pay, even though that patient may be a relief client the next day. In other words, neither certification nor payment can be made retroactive.

Special Program.—Erie County has a special county home and infirmary care program for individuals, except persons with mental disease, who need medical care and supervision on a long-term basis. It is available to persons on assistance programs as well as to those who do not qualify for a government program and yet are definitely in need of care. The home has a census of approximately 900 persons, with a special building set aside for persons under 50 years of age to aid them psychologically in their rehabilitation.

The program is administered by the department of social welfare, and its costs are charged against the budget of the department. Financial status as well as need for care determines eligibility. This program costs Erie County approximately $75 a month for both medical and supervisory care, or $44 per month for supervisory care alone.

PROVIDERS OF SERVICE

All licensed physicians in the county are eligible to participate in the welfare program. No written agreement is necessary. The physician treats the welfare patient as he does a private patient. Approximately 600 of the 1,400 physicians in Erie County submit bills regularly; however, more than 600 participate, since prescriptions written by other physicians are presented for payment even though they do not submit a personal bill for services rendered.

The nine general hospitals provide both hospitalization and outpatient clinic services to the welfare clients. The number of beds in each of these hospitals is given in the following tabulation.

The E. J. Meyer Memorial (County)	858
Allied Hospital of the Sisters of Charity	722
Deaconess	277
Lafayette General	63
Mercy	325
Millard Fillmore	473
St. Francis	53
Our Lady of Victory	229
Buffalo General	448

The Buffalo General Hospital has a large pediatrics clinic, and the health department operates well-baby, prenatal, chest, venereal disease, and orthopedic clinics. All health department clinics are staffed by physicians on an hourly basis. Clients of all programs are eligible to attend any of these clinics. Forty-five nursing homes participate in providing convalescent care. Patients may have their own physicians in these homes, but not if they go to the county convalescent home.

PAYMENT FOR SERVICES

Physicians are paid directly by the local department of social welfare at the rate of $2.00 for an office call and $3.00 per home call. There is also a general fee schedule agreed to by the department of social welfare and the Erie County Medical Society. The schedule covers obstetrics, minor surgery, x-ray, and fractures and dislocations. The fees are approximately 50% of the Workmen's Compensation Fee Schedule.

A specialist on consultation in cases "not amenable to treatment by a general practitioner" receives $4.00 per office or home visit. He must be referred to the case by the attending physician or by the physicians in the medical division of the department of social welfare. Such referrals are usually made only in areas where clinics are not easily accessible.

A flat rate of $11.75 per day is paid to the hospitals. This is an all-inclusive rate paid to all hospitals handling public assistance cases and comes from state and county funds. In the general assistance cases, the county alone pays for services. If a patient who is not on an assistance program is admitted to a hospital, the hospital social workers make a financial investigation. The person is asked to pay $2.50, $5.00, $7.50, or $11.75 (full rate), or may be declared eligible for free service as a staff case, depending on the result of this investigation.

Public funds are not available for in-hospital medical and surgical care; therefore, physicians are not paid for staff cases and may not be paid for the part-pay cases mentioned above in any of the nine general hospitals.

Nursing service provided by the Visiting Nurses Association is paid for at the rate of $2.15 per visit. Nursing homes are paid at the rate of $110 per month if they provide more than custodial care, while $90 a month is paid to those which provide only supervision. A person must have a medical recommendation to qualify for convalescent home care.

COSTS AND FINANCIAL SUPPORT

The medical services of Erie County indigent cases are financed by tax funds from federal, state, and county governments. The funds provided have generally been sufficient to carry out the program in its entirety. The total cost for medical care for all programs for an average month (April, 1951) was $168,072. The costs by program are shown in the table.

The cost figures given in the table should be considered as samples or estimates, since the number of persons on the rolls of each program changes constantly. It is evident, however, that the cost of hospital services is considerably greater than the cost of physician services. Much of this cost difference is undoubtedly due to the fact that physicians are not paid for in-hospital medical care.

Appropriations are made annually and are based on the previous year's experience. Since the funds for indigent medical care come within a departmental budget, an emergency grant may be procured should the appropriation prove inadequate.

THE MEDICAL DIRECTOR OF ERIE COUNTY

After World War II, the large population increase in townships adjacent to Buffalo brought about new problems in the welfare field. The Erie County board of supervisors saw that raising the level of medical care and providing complete service was impractical on a township by township basis. It was agreed that improving medical care for welfare clients could best be accomplished by merging all medical services into a single county plan. On July 1, 1946, the New York State Legislature acted to permit such mergers, and Erie County took immediate advantage of the new law to reorganize its indigent care program. In the course of this reorganization certain units and positions were abolished and new ones created. The Buffalo City Hospital became the E. J. Meyer Memorial (County) Hospital; the Erie county department of charities and correction was dissolved, and its functions were assigned to the department of social welfare, thus expanding this department to a county basis. The health departments of surrounding communities were incorporated in a county health department. The position of county physician and the position of medical consultant to the city department of social welfare were abolished, and a new position created, titled "Erie county medical director."

Medical-Hospital Care, Erie County, April, 1951

Programs	No. Persons Eligible	Cost per Person			Total Cost		
		Hospital	Physicians and Drugs	Total	Hospital	Physicians and Drugs	Total
Aid to Blind	170	$2.84	$2.34	$5.18	$ 483	$ 397	$ 880
Aid to Disabled	927	5.70	0.71	6.41	5,283	660	5,943
A. D. C.	3,210	2.71	1.24	3.95	8,697	3,972	12,669
O. A. A.	6,060	3.73	2.01	5.74	22,618	12,188	34,806
Home Relief *	5,284	19.87	1.66	21.53	105,005	8,769	113,774
					$142,086	$25,986	$168,072

* This is the program for the indigent and medically indigent and also includes county infirmary cases described under Special Programs.

The purpose of the reorganization was to create an office that could coordinate Erie County's various medical activities, avoid duplication and overlapping of services and provide professional guidance to the total medical care program. This is done by the medical director and his staff. He is the liaison officer between the department and all agencies or agents providing medical care. He attends meetings of the medical society, the board of social welfare, the board of managers or laboratory, and the Meyer Hospital's board of managers. The seven part-time physicians working under the medical director are given the title "medical investigators." These men act as medical advisors to the social work staff and interview all clients with medical problems. In addition, they call at the various hospitals to review the medical histories and charts of hospitalized clients and thus prepare themselves to discuss the cases with the social work staff. The success of the Erie County plan is due in no small degree to the capable administrator who is now Erie County medical director.

MEDICAL SOCIETY RELATIONSHIP

The medical society of the county of Erie plays an important though unofficial part in the indigent medical care program. The medical director is a member of the medical economics committee of the society, and the society has a spokesman, who is a physician, on the Erie County board of social welfare to represent the medical viewpoint. The society works closely with the medical division not only in urging physicians to participate but in formulating medical policies and in developing rules,

procedures, and the fee schedule; for example, by agreement between the Erie County welfare department and the Erie County medical society, all medical service by physicians in hospitals is rendered without charge. This agreement is based on the fact that the University of Buffalo has a medical school that uses the various hospitals as teaching units and, therefore, needs staff cases for teaching purposes.

Another interesting example is the limitation of free choice of physician agreed to by the medical society and the social welfare department. Free choice is restricted only to the extent that (1) if the medical division questions the adequacy of care by the individual physician, the division may direct the client to go to a hospital clinic for complete medical examination, and (2) patients in hospitals are to be cared for without pay or are placed under the care of the physician or surgeon on service at the time.

Every member of the medical society is provided with an outline showing clearly how he can participate and the services that are available to him and to the welfare patient. These outlines of procedure and policy have the approval of the medical society and simplify physician cooperation.

SUMMARY

Medical care for welfare recipients in Erie County is provided through a well-coordinated and complete service program. While it depends to some degree on the liberality of New York State laws for its organization, its successful operation is the result of a close and continued cooperation between all of the agencies and groups involved. Administration is entirely local and provides for adequate medical supervision and direction.

The Erie County department of social welfare administers all health care services as a unified program. All persons who qualify as welfare recipients are permitted the same services and the same facilities. Overlapping services and duplication of effort, two bugaboos of good administration, are practically nonexistent. Certification is handled by qualified case workers, each of whom has responsibility for all welfare recipients in a given area. Since all recipients may have the same privileges, there is no scrambling from one group to another in order to obtain special medical services. Further, a relief client has potentially available to him every medical service that can be provided in the county of Erie.

The medical division of the department of social welfare occupies a unique position in medical care administration. In reviewing and approving all bills for medical service, it serves as a protection against abuses by either physicians or recipients. Its authority to decide what, if any, special services a person needs makes it possible for every case to be considered on an individual basis. Direction of the division by a physician and an adequate staff of physicians assures the program of medical supervision and of the professional viewpoint so necessary to sound planning and administration.

The attitude of the medical society toward the county welfare program and the relationship between the society and the medical division assures the recipients of high quality medical care. The interests of those who are ill, of the general public, and of the physicians whose services are used in the program are all considered in relation to each other so that each gains as a result. Control measures are necessary to prevent abuse of the program and are accepted in a spirit of cooperation and good will.

One goal of this comprehensive program is rehabilitation, and any service will be authorized that the medical division believes will aid in returning the client to a normal life, whether it be as a worker or as a housewife. It is obvious that one-time costs that will return a man to work are much more economical than long-term care. While this is not a new concept, it is usually found on paper and rarely, as here, in operation.

The Erie County indigent medical care plan accomplishes the primary objective of any such plan. It makes available to the indigent sick all of the medical, hospital, and related services available to other citizens of the community and does this with a minimum of disturbance in the normal physician-patient relationship. Further, it has succeeded in partially compensating private physicians on a fee basis and in utilizing all available facilities, private and public, at a minimum of cost to the taxpayer.

BUREAU OF LEGAL MEDICINE AND LEGISLATION

MEDICOLEGAL ABSTRACTS

Income Taxes: Kickbacks, As "Ordinary and Necessary" Business Expense.—The Commissioner of Internal Revenue refused to allow the petitioners to deduct the payment of kickbacks to physicians as "ordinary and necessary" business expenses under the income tax law. The action of the Commissioner was upheld by the tax court and the United States Court of Appeals, Fourth Circuit, (Lilly et al., v. Commissioner of Internal Revenue, 188 F. [2d] 269 [1951]; J. A. M. A. **147:**1298 [No. 24] 1951) so the petitioners appealed to the Supreme Court of the United States.

The petitioners were engaged in the business of grinding, fitting, and selling eyeglasses and spectacles. They entered into oral contracts with various oculists whereby petitioners agreed to pay the oculists one-third of the retail price of all eyeglasses and spectacles purchased by patients sent to them by the oculists. The evidence shows that the oculists did not regularly inform their patients of this rebate arrangement, but such a disclosure was made only when it was specifically requested by individual patients. The sole issue in the case, as considered by the Court of Appeals, was whether or not these rebates paid by the petitioners to the oculists were deductible as "ordinary and necessary" business expenses.

The facts are not in dispute said the Supreme Court. The payments to the oculists were made by petitioners monthly in the regular course of their business. Under the long-established practice in the optical industry in the localities where the petitioners did business, these payments, in 1943 and 1944, were normal, usual, and customary in size and character. The transactions from which they rose were of common or frequent occurrence in the type of business involved. They reflected a nationwide practice. Consequently, they were "ordinary" in the generally accepted meaning of that word.

The payments likewise were "necessary" in the generally accepted meaning of that word. It was through making such payments that petitioners had been able to establish their business. Discontinuance of the payments could have meant, in 1943 or 1944, the oculists reference of their patients to other opticians who did share profits with them. Several oculists testified that they had recommended petitioners and the petitioners' competitor, the American Optical Company, both of which were sharing profits with the oculists on substantially the same basis. If either had stopped making the payments while the other continued them, there is no reason to doubt that the oculists thereafter would have omitted their recommendation of the nonpaying optician.

The tax court in the instant case made no finding of fact that the payments to the oculists were not ordinary and necessary business expenses. It sustained the commissioner's disallowance of their deductibility, because it held that, as a matter of law, the contracts under which the payments were made violated public policy.

Assuming for the sake of argument that business expenditures that are ordinary and necessary in the generally accepted meaning of these words may not be deductible as "ordinary and necessary" expenses when they "frustrate sharply defined national or state policies proscribing certain types of conduct"; nevertheless, the expenditures now before us do not fall into that class said the Supreme Court. The policies frustrated must be national or state policies evidenced by some governmental declaration of them. In 1943 and 1944, there were no such declared public policies proscribing the payments that were made by petitioners to the oculists.

Customs and the action of organized professional organizations have an appropriate place in determining what are ordinary and necessary expenses at a given time and place; for example, they materially affect competitive standards that determine whether certain expenditures are in fact ordinary and necessary. Evidence of them is admissible on that issue. They do not, how-

ever, in themselves constitute the "sharply defined national or state policies" the frustration of which may, as a matter of law, preclude the deductibility of an expense under the income tax law.

"We voice no approval of the business ethics or public policy involved in the payments now before us," the court concluded.

Accordingly, the judgment of the court of appeals was reversed and the cause remanded to the tax court with directions to set aside its judgment insofar as it is inconsistent with this opinion. *Lilly v. Commissioner of Internal Revnue, 72 S. Ct. 497 (1951).*

Pharmacy Schools: Classification by Private Association.—The plaintiff filed a petition for a writ of mandamus to compel the respondent, Florida State Board of Pharmacy, to permit Abraham Newman to take the state pharmacy examination. From an order of the trial court granting the writ, the respondent appealed to the Supreme Court of Florida.

The evidence indicated that Newman was over the age of 21 years old and of good moral character and was licensed to practice pharmacy in both New York and Connecticut. He graduated from Fordham College of Pharmacy in 1930. At that time, Fordham was not a member of the American Association of Colleges of Pharmacy, but it became a member in 1939, and has remained a member ever since. The sole question presented for determination, said the court, is whether the petitioner has complied with the statute by showing that he is ". . . a graduate of an 'accredited school or college or pharmacy holding membership in the American Association of Colleges of Pharmacy and accredited by said board of pharmacy.'"

A construction of this language presents some difficulty, said the court. It is the duty of the court to, if possible, ascribe to the language used a meaning that will not cause the statute to be unconstitutional. The word "accredited" and the phrase "accredited by said board of pharmacy" cannot be held to vest in the Florida State Board of Pharmacy an unlimited and uncontrolled discretion in determining which schools will be accepted as "accredited" without rendering the act invalid. The statute provides no standard that a college must attain to be accredited by the board, unless such standard be found in the phrase "such school or college of pharmacy holding membership in the American Association of Colleges of Pharmacy."

Membership in a voluntary association, which may be denied at the whim of the association or declined at the pleasure of the school, the court continued, is in no sense a reasonable basis for determining the proficiency of the graduates of an institution. If the phrase be construed as ambulatory, the statute to that extent is unconstitutional. The respondents admit that the statute cannot be construed as ambulatory in prospect but urge that it be so construed as to relate to those institutions that were members of the association when the act became effective and were also members of the association at the time this particular applicant received his diploma. This would make the statute more logical, the court admitted, but there is nothing in the language used by the legislature that would justify the court in holding this statute ambulatory in retrospect and not ambulatory in prospect.

The only construction that this court can place on the statute as written, which does not offend the constitution, concluded the Supreme Court, is that the phrase "such school or college of pharmacy holding membership in the American Association of Colleges of Pharmacy" constitutes a definition of an "accredited" school and must be construed as being fixed as of the date of the enactment of this statute, so that, in reality the statute constitutes a legislative determination that those schools that were on the membership rolls of this association at that time are designated as "accredited" just as if each such school had been designated by name in this statute. Adopting this construction, said the court, the statute as applied to Newman could be paraphrased to require an applicant to be "a graduate of one of the following schools . . . Fordham College of Pharmacy. . . ." Since the petitioner is admittedly a graduate of Fordham, his right to take the examination is clear. Accordingly, the writ of mandamus, directing that Newman be admitted to the examination, was affirmed. *Attwood et al. v. State ex rel. Newman, 53 So. (2d) 825 (Florida, 1951).*

MEDICAL MOTION PICTURES

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Functional Anatomy of the Hand: 16 mm., color, sound, showing time 28 minutes. Produced in 1951 by Duke University, Department of Anatomy, Durham, North Carolina. Procurable on loan (service charge $1.00) from Committee on Medical Motion Pictures, American Medical Association, 535 North Dearborn Street, Chicago 10, or National Foundation for Infantile Paralysis, 120 Broadway, New York 5.

The film graphically depicts normal function of the muscles of the hand and forearm as well as the relation of the muscles to the skeletal structure. To demonstrate function, the arm has been dissected so that wires could be attached to individual muscles and their operation shown either individually or in groups. To depict the relation of the muscles to the skeletal structure, each muscle as it is described by the narrator is positioned in its proper place on the skeleton. This film is remarkable for the extremely clever dissection, which enables the anatomist to work the individual tendons of the wrist and fingers, and for the adroit use of a mirror whereby the same movement is viewed from two aspects at once.

The photography is satisfactory; however, the overlay labels are very poor and somewhat distracting. The picture is long, and it may be advisable to show it in sections. A 16-page brochure is sent with each copy of the film, and it is important that the teacher read this booklet before the picture is used in classroom situations. It can be recommended for orthopedic surgeons, medical students, physical therapists, and occupational therapists.

The Quiet One: 16 mm., black and white, sound, showing time 66 minutes. Produced in 1948 by Film Documents, New York. Procurable on loan (service charge $8.00) from Committee on Medical Motion Pictures, American Medical Association, 535 North Dearborn Street, Chicago 10.

This film portrays the story of a 10-year-old boy who had the misfortune to be born into a family that resented his existence and left him to shift for himself. It vividly shows the hopeless struggle that builds up in the mind of a child continually denied the feeling of being wanted and how he eventually drifts into delinquency. The child is sent to a correction school for wayward boys staffed by experienced counselors under the direction of a psychiatrist. The job of emotional rehabilitation is what makes this film so fascinating to students of human behavior. The groups who might profit from this film are medical students or residents in pediatrics or psychiatry, persons connected with child care institutions as staff or volunteer workers, social workers and nurses preparing for public health work or pediatrics, and teachers working with retarded children.

The complete review of this film can be found in THE JOURNAL (**145:**110 [Jan. 13] 1951) or in "Reviews of Medical Motion Pictures," 1951 supplement, page 11.

Breakdown: 16 mm., black and white, sound, showing time 42 minutes. Produced in 1951 for the Mental Health Authorities of the Provinces of Canada by the National Film Board of Canada. Procurable on loan (service charge $3.00) from Committee on Medical Motion Pictures, American Medical Association, 535 North Dearborn Street, Chicago 10.

This film deals with a young girl's schizophrenic breakdown: its onset and development, the effect on her family and her friends, her hospitalization in a modern mental hospital, and her eventual discharge as recovered. Psychiatrists, psychologists, and others in allied professions can use the film to good advantage when they are called on to present mental health information to special interested groups. The film is also recommended for county and state medical meetings and for college students in medical, nursing, social work, and psychology departments.

The complete review of this film can be found in THE JOURNAL (**147:**1490 [Dec. 8] 1951) or in "Reviews of Medical Motion Pictures," 1951 supplement, page 54.

MEDICAL LITERATURE ABSTRACTS

UNITED STATES

A.M.A. Arch. Internal Medicine, Chicago

89:171-352 (Feb.) 1952

Walter Reed: "He Gave to Man Control of That Dreadful Scourge—Yellow Fever." W. B. Bean.—p. 171.
Studies of Fluid, Electrolyte, and Nitrogen Balance in Acute Renal Insufficiency. L. T. Iseri, T. M. Batchelor, A. J. Boyle and G. B. Myers.—p. 188.
Practical Control of Fluid and Electrolyte Balance in Carbon Tetrachloride Nephrosis: Report of Cases. R. C. Partenheimer and D. S. Citron.—p. 216.
Electrolyte Metabolism During Rice Diet: I. Serum Electrolytes in Hypertensive Patients Without Evidence of Advanced Renal Involvement. E. Peschel and R. Lohmann-Peschel.—p. 234.
*Terramycin Therapy of Urinary Tract Infections. C. R. Womack, G. G. Jackson, T. M. Gocke and others.—p. 240.
Explosive Outbreak of Atypical Pneumonia ("K-8 Fever"). P. Troen.—p. 258.
*Viremia in Acute Hemolytic Anemia and in Autohemagglutination: Report of Case and Review of Literature, with Special Reference to Virus of Newcastle Disease. S. E. Moolten and E. Clark.—p. 270.
*Hemolytic Anemia in Viral Pneumonia with High Cold-Agglutinin Titer. R. S. Aaron.—p. 293.
Conversion of Lymphocytic Leukemia to Hodgkin's Disease. M. Krim, L. M. Meyer, J. Rosenthal and N. D. Ritz.—p. 297.
Essential Lipemia, Acute Gout, Peripheral Neuritis, and Myocardial Disease in a Negro Man: Response to Corticotropin. J. K. Fulton.—p. 303.
Syphilis: Review of Recent Literature. H. Beerman, W. T. Ford, L. Nicholas and L. Katzenstein.—p. 309.

Terramycin Therapy of Urinary Tract Infections.—As part of a general clinical evaluation of terramycin, studies were made in 112 patients with acute and chronic infections of the urinary tract. Escherichia coli and Aerobacter aerogenes, most frequently present before treatment, were eliminated during terramycin therapy in most cases. Strains of Proteus vulgaris and staphylococci were less frequent in the pretreatment specimens of urine, but these organisms persisted in a greater proportion of cases and appeared more frequently for the first time during or shortly after terramycin therapy. The urine was rendered bacteria-free in about 37% of all the cases and in 20% of those in which more than one strain was originally present. In the remaining cases the original organism persisted and/or additional strains appeared in the urine and maintained the infection. Bacteremia rapidly subsided in most instances, but occasionally it developed during terramycin therapy. There was a fairly good correlation between the sensitivity of the strains to terramycin in vitro and the effects of treatment with this antibiotic. Most of the sensitive strains were readily eliminated, while one-half of the resistant strains isolated before treatment persisted, and most of the other resistant strains appeared during or soon after the terramycin therapy. Pyuria diminished or disappeared in about one-half of the cases, more frequently in acute cases. Fever and local symptoms were favorably influenced in more than one-half of the cases, but in some the improvement was only temporary. On the basis of both clinical and laboratory findings, about one-half of the patients were benefited by the terramycin therapy. There were 14 deaths, which occurred primarily in old persons and in some cases were probably unrelated to the urinary infection. The most important feature of the fatal cases was the frequent occurrence during terramycin therapy of pathogenic strains of hemolytic Staphylococcus pyogenes var. aureus; the infections for which they apparently were responsible included staphylococcal pneumonia, endocarditis with embolic phenomena, and staphylococcal dysentery. In some instances vomiting and/or diarrhea was severe enough to interfere with terramycin therapy, and this was a major factor in most of the fatal cases.

Viremia in Hemolytic Anemia and the Virus of Newcastle Disease.—A case of acute hemolytic anemia with autohemagglutinative vascular phenomena is reported in which the virus of Newcastle disease (avian pneumoencephalitis) was isolated from the patient's blood shortly after the acute phase of her illness had subsided. During the active stages of the illness the patient had an eruption resembling that of acute disseminated lupus erythematosus. Cortisone and corticotropin (ACTH) therapy produced temporary improvement, followed by relapse during their continued administration. The spontaneous infection with Newcastle virus in this patient, as in a recent epizootic in laboratory hamsters, is probably related to lowering of the natural resistance for a virus that may be widely prevalent in mammals but is ordinarily latent. Similarities between the acute hemolytic syndrome of this case and that of others reported in the literature suggest that hemotoxic viruses may be commoner than is suspected as a cause of acute hemolytic anemia. Certain data appear to indicate that acute hemolytic anemia and hemagglutinative syndromes complicating Hodgkin's disease, leukemia, lymphosarcoma, and other diseases of the reticuloendothelial system may result from the multiplication of latent viruses as a result of impaired antiviral resistance. Nutritional deficiencies may play a similar role. The presence of immune agglutinins for red blood cells, revealed by the Coombs' test, may be explained in some instances by antiviral substances attached to virus-sensitized red cells and not necessarily by the presence of a hemolytic autoantibody. On the other hand, the absence of a positive Coombs' antiglobulin reaction in acute hemolytic anemia (as in the case cited here) may be accompanied by a positive antialbumin reaction, suggesting that serum albumin has been absorbed as a result of viral injury or other hemotoxic agent. In such cases a false-positive Coombs' test may be obtained with Coombs' reagent prepared by immunizing rabbits with whole human serum. Examination of the blood for viruses may be warranted in various clinical conditions in which resistance to infection may be impaired, particularly when complicated by hemolytic or hemagglutinative phenomena demonstrable by laboratory methods or manifested as acquired hemolytic anemia or atypical vascular symptoms, such as Raynaud's syndrome or acrocyanosis. In tests in 17 other patients showing autohemagglutination in vitro, hemagglutinating viruses were recovered in 14.

Hemolytic Anemia in Viral Pneumonia and High Cold Agglutinin Titer.—The association of cold agglutinins and primary atypical pneumonia has been frequently noted. This paper describes the case of man, aged 46, in whom hemolytic anemia occurred in viral pneumonia associated with a high cold agglutinin titer. The cold agglutinin titer was positive in the dilution of 1:4,096 during the acute phase of the illness, and was the last laboratory finding to return to normal. The author believes that the positive serologic reactions for syphilis and an increased heterophile-agglutination titer were coincidental findings. He points out that in syphilitic cold hemoglobinuria, anemia usually does not occur, the cold agglutinins are not found in such high titer, and the Donath-Landsteiner test (hemolysis at 37 C after chilling, but not in the cold) always produces a positive reaction. In spite of the high heterophil agglutination and mild adenopathy, the absence of atypical lymphocytes and hepatosplenomegaly would tend to exclude infectious mononucleosis. Unfortunately, the agglutination was not performed at incubator temperature, nor was the more specific test with guinea pig kidney absorption used. The author feels that the cold agglutinin titer should be determined in all cases of unexplained hemolytic anemia.

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Titles marked with an asterisk (*) are abstracted.

A.M.A. Arch. Neurology and Psychiatry, Chicago

67:1-134 (Jan.) 1952

Severe Sensory Changes, and Trophic Disorder, in Peroneal Muscular Atrophy (Charcot-Marie-Tooth Type). A. C. England and D. Denny-Brown.—p. 1.
Dynamic Concepts of Migraine: Character Study of 100 Patients. A. R. Furmanski.—p. 23.
*Fatalities in Insulin Therapy of Psychoses: Analysis of Eight Cases. A. E. Scheflen, E. R. Reiner and W. W. Jetter.—p. 32.
Myoclonus of Muscles of Eye, Face, and Throat. M. B. Bender, M. Nathanson and G. G. Gordon.—p. 44.
Changes in Phosphatase Activity of Serum and Urine After Shock Therapy. M. D. Altschule and B. H. Parkhurst.—p. 59.
Blood Glutathione Level in Mental Disease Before and After Treatment. M. D. Altschule, E. P. Siegel and D. H. Henneman.—p. 64.
Does Nystagmus Occur in Lesions of Cervical Cord? C. B. Booth.—p 69.
Nonaphasic Misnaming (Paraphasia) in Organic Brain Disease. E. A. Weinstein and R. L. Kahn.—p. 72.
Results of Treatment of Schizophrenia in a State Hospital: Changing Trends Since Advent of Electroshock Therapy. G. E. Currier, C. Cullinan and D. Rothschild.—p. 80.
Meningococcic Meningitis: Incidence of Residua Following Serum, Sulfonamide, and Sulfonamide-Penicillin Therapy. A. T. Ross.—p. 89.

Fatalities in Insulin Coma Therapy.—In the last 11 years eight deaths incident to insulin coma or subcoma therapy have occurred in psychiatric hospitals in Massachusetts. These eight cases are discussed. The authors feel that the following factors may be of value in anticipating adverse reactions: (1) a history of respiratory collapse or syncope following administration of medication; (2) factors adversely affecting the physiological systems regulating insulin-glucose relationships, such as malnutrition, avitaminosis, use of certain drugs, autonomic imbalance, and excessive fear of treatment; (3) undue resistance to insulin, as manifested by high dose requirements or the occurrence of relatively few comas, which may be accompanied by over-activity of the sympathetic nervous system, excessive fear of treatment, and a tendency to sudden cardiorespiratory complications; (4) undue sensitivity to insulin as manifested by low or rapidly decreasing dose requirements, unusually deep coma, difficulty in termination of coma; a tendency to "after-shock," and probably, the presence of low pulse rate and temperature.

American Journal of Medical Sciences, Philadelphia

223:1-116 (Jan.) 1952

*Short-Term Effect of Pitressin in Rheumatoid Arthritis. G. G. Haydu and B. W. Haydu.—p. 1.
*Treatment of Lupus Erythematosus Disseminatus with Cortisone. S. A. M. Johnson and O. O. Meyer.—p. 9.
Cortisone Treatment of Trichinosis. E. Rosen.—p. 16.
Neomycin in Treatment of Human Amebiasis. L. V. McVay Jr., R. L. Laird and T. N. Stern.—p. 20.
Influence of Low-Fat Diet on Blood Lipid Levels in Health and in Multiple Sclerosis. V. A. Wilmot and R. L. Swank.—p. 25.
Cerebral Manifestations of Acute Myocardial Infarction. S. L. Cole and J. N. Sugarman.—p. 35.
Effect of Cortisone in Experimental Myocardial Infarction. D. W. Chapman, R. H. Skaggs, J. R. Thomas and J. A. Greene.—p. 41.
Response of Patients with Congestive Heart Failure to Rapid Elevation in Atmospheric Temperature and Humidity. G. S. Berenson and G. E. Burch.—p. 45.
Leukemoid Bone Marrow in Pernicious Anemia. M. B. Strauss, R. Brokaw and C. B. Chapman.—p. 54.
Pernicious Anemia Superseded by Polycythemia Vera: Report of Case. J. Galt, R. B. Hunter and J. M. Hill.—p. 61.
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Sulfaguanidine Absorption and Excretion Following Low Oral Maintenance Doses in Man. L. H. Lonergan.—p. 83.
Hyperglycemia and Glycosuria in Chronic Alcoholic with Hepatic Insufficiency. Clinical Observations in 10 Patients. C. M. Leevy, J. C. Fineberg, T. J. White and A. M. Gnassi.—p. 88.
Hepatic Factors in Salt and Water Metabolism. J. R. Snavely.—p. 96.
Psychological Problems in Physical Rehabilitation: Review. R. H. Barnes. —p. 106.

Vasopressin in Rheumatoid Arthritis.—Four units of vasopressin (pitressin®) were given intramuscularly to 16 patients with joint pains, stiffness, and limitation of joint motion. Because of the potential undesirable cardiac effects of vasopressin, only patients whose blood pressure and electrocardiograms were normal were selected. The drug was employed only for the study of the pathogenesis of rheumatoid arthritis and not as a form of therapy. Results showed that the eight patients who subsequently were found to have rheumatoid arthritis responded quickly and substantially to vasopressin. There was considerable reduction of pain and stiffness and a significant increase in the motion of the joints. The other eight patients with pain and stiffness due to trauma or osteoarthritis were not improved and did not have an increase in the range of joint motion after the injection of vasopressin. In the patients with rheumatoid arthritis the short-term effect of vasopressin began within half an hour, and continued into the next day to a lesser degree. The level of circulating eosinophils was determined in additional patients with rheumatoid arthritis before and half an hour and four hours after the administration of the drug. Results showed that the number of circulating eosinophils was not reduced, and consequently the improvement in symptoms was not due to stimulation of the adrenal cortex by vasopressin. After administration of vasopressin a pronounced eosinophilia developed that continued into the next day. No hemoconcentration was observed after the injection. The short-term effect in the authors' patients confirmed the results of previous studies, which suggested that increased adenosintriphosphatase activity of the tissues may be basic to the nature of rheumatoid arthritis. Vasopressin produces a very characteristic inhibition of adenosintriphosphatase activity and thus alleviates the symptoms of rheumatoid arthritis.

Cortisone in Lupus Erythematosus Disseminatus.—Nine female patients between the ages of 14 and 47 with lupus erythematosus disseminatus were treated with cortisone. Of the nine patients, four received continuous treatment, usually 100 to 200 mg. of cortisone daily until a total dose of 6 gm. had been given, and four patients received 200 mg. daily for 10 days with repetition of treatment after 20-day intervals for two subsequent courses. In one patient treatment had to be discontinued after 2 gm. had been given because she developed a psychosis with delirium, labile mood, loquaciousness, confusion, agitation, disorientation, and incontinence. Administration of cortisone was usually effective in the amelioration of symptoms and signs of lupus erythematosus disseminatus, but subjective and objective improvement was not sustained after cessation of treatment. Relapse usually occurred, and one patient's condition was worse six weeks after treatment than before cortisone had been given. In another patient cortisone treatment was very valuable in tiding her over an acute episode with pericarditis and pleuritis, and improvement continued for eight months after cessation of treatment. Cortisone therapy probably is most valuable in treatment of such acute episodes, when it may carry the patient over a critical period and be life-saving. Certain complications, such as ascites or psychosis, may necessitate cessation of therapy or reduction of dosage. These should be watched for so that proper steps for control may be promptly instituted.

American Journal of Medicine, New York

12:1-136 (Jan.) 1952

Relationship Between Relapsing Pancreatitis and Essential Hyperlipemia. G. Klatskin and M. Gordon.—p. 3.
Antithrombin Titer in Acute Pancreatitis. I. Innerfield, A. Angrist and J. W. Benjamin.—p. 24.
Calcium, Potassium, Magnesium and Amylase Disturbances in Acute Pancreatitis. H. A. Edmondson, C. J. Berne, R. E. Homann Jr. and M. Wertman.—p. 34.
Charcot Joints and Infectious-Vascular Lesions of Bones in Diabetes Mellitus. B. Beidleman and G. G. Duncan.—p. 43.
*New Liver Extract Derived from Pregnant Mammalian Liver: I. Its Effect on Peripheral Neuropathy. W. S. Collens, J. D. Zilinsky, J. J. Greenwald and A. B. Stern.—p. 53.
*Experiences with New Liver Extract for Treatment of Diabetic Neuropathies. I. M. Rabinowitch.—p. 59.
Problem of Cardiac Edema. J. P. Peters.—p. 66.
Congenital Heart Disease: Introduction and Classification. R. J. Bing. —p. 77.

Liver Extract for Peripheral Diabetic Neuropathy.—A new extract derived from the liver of pregnant mammals was given a therapeutic trial in 127 diabetic patients with manifestations of peripheral neuropathy. Treatment consisted of the daily intramuscular injection of 5 cc. of the liver extract. In most cases the injections were continued for two weeks. The injections were almost painless and produced no local irritation or constitutional reaction, except in three patients who developed

mild local allergic reactions after one week of daily therapy. The symptoms were reversed in 120 (94%) of the 127 patients, with excellent results in 56 (44%), good results in 50 (40%), and fair results in 14 (10%). Seven patients (6%) were therapeutic failures. In patients who had good to excellent results clinical remission occurred within a week of institution of treatment. While improvement in vibratory sense could be detected quantitatively, this reversibility first became evident two to four weeks after treatment was started. Disturbances in tendon reflexes and the muscle atrophy seemed to be irreversible. A two week course of treatment usually produced a remission for two to six months. Resumption of treatment during the relapse generally effected a prompt remission comparable with the initial remission. When there was a tendency for relapses to occur, administration of the extract once a week maintained the patient in continuous remission. Remissions have been observed for as long as two years. The therapeutic effects were probably derived from components not previously isolated from the liver. Analysis of the extract revealed the presence of only 0.09 μg of vitamin B_{12} and 0.15 μg of folic acid per milliliter, quantities that have no therapeutic role in the neuropathies.

Further Experiences with Liver Extract for Diabetic Neuropathies.—Of 20 diabetic patients with neuropathies treated with an extract of liver from pregnant mammals, 2 women had diabetic cord bladder, 1 had ulnar nerve palsy due to pressure, 1 advanced generalized vascular disease with a nonhealing ulcer of the leg and a previous history of severe diarrhea with nocturnal incontinence of feces, 1 partial foot-drop, and the remaining 15 had typical diabetic neuritis, with severe pain in one or more extremities. Treatment as a rule consisted of daily intramuscular injections of 5 cc. of the extract, and in a few cases the dose was 10 cc. Gratifying results were obtained in patients with hyperglycemic, achlorhydric, neuritic, vascular, and degenerative symptoms. Only 2 of the 20 patients did not obtain complete relief of symptoms, but both had associated psychic disturbances that made evaluation of results difficult. Rapid recoveries, even in patients with marked vascular and degenerative disturbances, were striking. Complete relief from pain and other manifestations were obtained despite the persistent hyperglycemia and glycosuria, which were permitted in order to exclude control of the diabetes mellitus as a variable in interpretation of these results. Complete relief of pain in a case complicated by widespread osteoarthritis was noted. There was no evidence that the liver extract had any effect on diabetes mellitus itself. Sixteen additional patients with diabetic neuritis of the extremities had been treated with the extract, and of the total of 36 patients subjected to this treatment, only three were therapeutic failures. An extensive trial is indicated in the early stages of diabetic retinopathy and in cases of sexual impotence associated with diabetes mellitus.

Am. Practitioner & Digest of Treatment, Philadelphia

3:1-88 (Jan.) 1952

Holistic Attitude in Medical Consultation. R. J. Weil and H. R. Landmann.—p. 1.

Angiocardiography in Definitive Diagnosis of Cardiovascular Disease. H. J. Jacobs.—p. 6.

Value of Protein in Surgery—Special Emphasis on Oral Feedings. E. R. Crews.—p. 13.

Sarcoidosis. H. L. Israel and M. Sones.—p. 18.

Methylparafynol—New Type Hypnotic: Preliminary Report on Its Therapeutic Efficacy and Toxicity. H. L. Hirsh and W. H. Orsinger.—p. 23.

*Symptomatic Relief of Osteo-Arthritis and Osteoporosis with Vitamin B_{12}: Preliminary Report. J. D. Hallahan.—p. 27.

Etiology, Pathologic Physiology and Diagnosis of Acute Pancreatitis. S. Y. Garrett.—p. 33.

Subluxation of Head of Radius. A. J. Kanter and O. C. Bruton.—p. 39.

Thrombopenic Purpura Following Quinine Medication. R. B. Lincoln and H. L. Schmidt.—p. 43.

Vitamin B_{12} in Osteoarthritis and Osteoporosis.—Since vitamin B_{12} is a potent bone marrow stimulant, Hallahan decided to try it in osteoporosis. Patients with osteoarthritis were to serve as controls, but when they showed great relief, it was decided to report this, and to further study the response of these patients to vitamin B_{12}. Crystalline vitamin B_{12} was given by injection in doses of from 30 to 100 μg at weekly intervals to 33 patients with osteoarthritis, the majority receiving 100 μg. By the end of the third week, all but 2 showed improvement, which was complete in 12; the others showed complete relief in some joints and partial relief in other joints. Only two patients with advanced osteoporosis were treated with vitamin B_{12}. In one of them the initial dose was 900 μg, and when she obtained prompt relief this dose was continued at weekly intervals for three weeks. As a result she became completely free of knee and back pain, but after the treatment had been discontinued for two weeks, the knee pain recurred. She was then given 30 μg per week and the symptoms again subsided, but recurred once more after the treatment had been interrupted for a month. This time 90 μg per week was given for one month, with her symptoms clearing more promptly than when 30 μg had been used. She was given several more courses of 90 μg per week. The other patient with osteoporosis was given injections of 90 μg weekly for three weeks and has remained free from discomfort for two months so far. Why vitamin B_{12} is effective in relieving symptoms of osteoarthritis and osteoporosis is not known. No benefit was noted in three cases of rheumatoid arthritis and one case of metastatic malignancy to bone. Benefit was achieved in one case of spondylolisthesis and in the polyneuritis of diabetes mellitus. No toxic effects were noted, although one case of gouty arthritis was possibly aggravated by a trial of vitamin B_{12}.

Gastroenterology, Baltimore

20:1-202 (Jan.) 1952

*Choice of Therapeutic Measures in Management of Chronic Relapsing Pancreatitis and Pancreatolithiasis. R. B. Cattell and K. W. Warren.—p. 1.

Time of Healing of Gastric Ulcers: Implications as to Therapy. F. Steigmann and B. Shulman.—p. 20.

Unfavorable Course of Gastric Ulcer During Administration of ACTH and Cortisone. J. B. Kirsner, A. P. Klotz and W. L. Palmer.—p. 27.

Results of Medical Treatment of Idiopathic Cardiospasm. A. C. Crump, C. A. Flood and G. C. Hennig.—p. 30.

Urine Coproporphyrin Excretion in Viral Hepatitis. D. A. Sutherland and M. Bollier.—p. 39.

Fat Absorption and Chylomicronemia. L. Marder, G. H. Becker, B. Maizel and H. Necheles.—p. 43.

Polycystic Disease of Liver: Study of 24 Cases. M. W. Comfort, H. K. Gray, D. C. Dahlin and F. B. Whitesell Jr.—p. 60.

Clinical Studies of Blood Lipid Metabolism: II. Blood Serum Variations of Cholesterol, Phospholipids, Neutral Fats, Total Lipids, and Blood Lipid Fraction Percentages in Peptic Ulcer Patients. A. A. Goldbloom.—p. 79.

Roentgen Diagnosis of Prolapse of Gastric Mucosa into Duodenum. M. Feldman and P. Myers.—p. 90.

*Prolapse of Gastric Mucosa Through Pylorus: Physiological or Abnormal? E. D. Bartels and H. Eltorm.—p. 100.

Complications of Gastrointestinal Diverticula Demonstrated by X-Ray. E. A. Mandelsohn.—p. 105.

Gastrointestinal Symptoms of Genito-Urinary Origin. D. R. Smith.—p. 119.

Study of Choledochal Spincter Action. J. L. Smith, R. L. Walters and J. M. Beal.—p. 129.

*Gastric Secretory Response to 3-Beta Aminoethyl Pyrazole in Man. J. B. Kirsner, E. Levin, W. L. Palmer and H. Ford.—p. 138.

Comparison of Plain Methylcellulose with Compound Bulk Laxative Tablet. D. A. Berberian, R. J. Pauly and M. L. Tainter.—p. 143.

Clinical Evaluation of Certain Bulk and Irritant Laxatives. L. J. Cass and L. P. Wolf.—p. 149.

Therapy of Relapsing Pancreatitis.—Chronic relapsing pancreatitis and pancreatolithiasis are characterized by recurrent attacks of epigastric pain. As the disorder progresses, varying degrees of pancreatic failure occur and give rise in turn to various gastrointestinal symptoms, malnutrition, jaundice, and occasionally diabetes mellitus. Cattell and Warren point out that despite medical treatment, surgical measures will be required in the majority of cases. The 29 patients here reviewed underwent a total of 91 operations. Twenty-one patients had had one or more abdominal operations related to the pancreatitis (a total of 43 operations) before coming to the Lahey Clinic. After listing and discussing the 48 operations performed at the Lahey Clinic on the 29 patients, the authors feel that their conclusions are still only tentative. Thoracolumbar sympathectomy, either unilateral or bilateral, is occasionally employed as a primary procedure, when the inflammatory reaction is so intense that resection is unduly hazardous, but since the good results of sympathectomy are usually temporary, this operation is done less often. Distal pancreatectomy is effective when the pathological process is confined to the distal segment of the pancreas, but it should not be employed in diffuse pancreatitis. Pan-

creatoduodenectomy permits removal of the common point of obstruction at the periampullary area of the duct of Wirsung, and allows removal of a major portion of the involved gland. Residual stones can be removed from the duct in the pancreatic remnant, and the duct can then be implanted into the jejunum. Although this procedure has not been effective in every case, it has given the best results. However, one should bear in mind that pancreatoduodenectomy is a difficult procedure and that alternative surgical methods are available. Occasionally, the best results are obtained with a combination of surgical procedures. The most promising combination is partial pancreatectomy, either proximal or distal, with contralateral thoracolumbar sympathectomy. Distal pancreatectomy will have a more limited applicability than pancreatoduodenectomy and therefore the combined procedure will usually consist of pancreatoduodenectomy, followed by left thoracolumbar sympathectomy if adequate relief is not obtained by resection.

Prolapse of Gastric Mucosa.—According to some authors prolapse of the gastric mucosa through the pylorus produces symptoms of dyspepsia, whereas others regard it as only a physiological variation. Reviewing the literature on this condition, Bartels and Eltorm found that the condition has no characteristic symptomatology and so they decided to study the roentgenograms of the stomachs of 240 patients admitted for treatment of dyspepsia. They found 44 (or 18.3%) who had gastric prolapse, and in 34 the prolapse was rather extensive. Then they studied 42 persons without dyspeptic complaints. This group included 10 with a typical large prolapse and 11 with small folds. In other words, the frequency of mucosal prolapse through the pylorus was higher among the control than among the dyspeptic group. The explanation is that a large number of the dyspeptic patients had deformities of the duodenal bulb because of ulcer or cancer, and in such cases a prolapse cannot be discerned. On the basis of these observations the authors believe prolapse of the gastric mucosa through the pylorus is a normal physiological variation.

Gastric Response to 3-β Aminoethyl Pyrazole.—Kirsner and associates studied the secretory response of the stomach to an analogue of histamine, 3-β aminoethyl pyrazole, in 50 persons: 22 without organic disease, 24 with peptic ulcer, and 4 with miscellaneous lesions. The secretory response to the analogue approximated that elicited by histamine. It is injected intramuscularly in 50 mg. doses. The decreased tendency to side-effects was striking, and all patients emphatically preferred the new material. The analogue thus appears to be a potent and nontoxic substitute for histamine for the study of gastric secretion in man.

Indiana State Medical Assn. Journal, Indianapolis

45:1-84 (Jan.) 1952

Blood-Containing Urachal Cyst Simultating Acute Appendicitis: Report of Case. G. C. Rasch.—p. 17.
Toward Optimal Nutrition. P. Kurtz.—p. 19.
Quinidine Treatment of Ventricular Tachycardia Following Acute Coronary Occlusion: Case Report. R. U. Leser and R. H. Opfell.—p. 23.
Breast Feeding. R. B. DuBois.—p. 28.
Flashlight in Rectum. M. O. Scamahorn.—p. 31.

45:85-176 (Feb.) 1952

Cardiac Arrest Under Anesthesia. W. R. Stilwell and L. B. Mueller.—p. 109.
Xanthoma Tuberosum: Report of Case. J. R. Porter II and H. L. Auerbach.—p. 116.
Psittacosis: Report of Three Cases. M. A. Bassett.—p. 119.
Problems of Parenteral Nutrition in the Surgical Patient. C. O. Rice and J. H. Strickler.—p. 122.

Iowa State Medical Society Journal, Des Moines

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Amebiasis in Iowa: Diagnosis and Treatment. H. E. Hamilton and D. C. Zavala.—p. 1.
Spontaneous Hypoglycemia: Use of Provocative Insulin Test. R. P. Hardwig and C. E. Schrock.—p. 6.
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Changing Trends in Surgery of Colon. G. Crile Jr. and R. B. Turnbull Jr.—p. 12.
Importance of Life Planning. V. F. Nellis.—p. 16.

Journal of Applied Physiology, Washington, D. C.

4:497-628 (Jan.) 1952

Analysis of Factors Affecting Concentrations of Oxygen and Carbon Dioxide in Gas and Blood of Lungs: Results. K. W. Donald, A. Renzetti, R. L. Riley and A. Cournand.—p. 497.
Alveolar CO_2 Measured by Expiration Into Rapid Infrared Gas Analyzer. A. B. DuBois, R. C. Fowler, A. Soffer and W. O. Fenn.—p. 526.
Alveolar CO_2 During Respiratory Cycle. A. B. DuBois, A. G. Britt and W. O. Fenn.—p. 535.
Temperature of Human Bone Marrow. N. L. Petrakis.—p. 549.
Rate of Pulmonary Nitrogen Accumulation as Index of Lung to Blood Transfer of Gases. H. Specht and H. F. Brubach.—p. 554.
Factorial Experiment to Test Effect of Various Types of Diets on Uric Acid Excretion of Normal Human Subjects. D. Wilson, C. Bishop and J. H. Talbott.—p. 560.
Effect of Analeptic Drugs on Somnifacient Effect of Seconal and Antihistaminics as Measured by Flicker Fusion Threshold. G. S. Roback, L. R. Krasno and A. C. Ivy.—p. 566.
Body Composition of Cattle: II. Determination of Fat and Water Content from Measurement of Body Specific Gravity. H. F. Kraybill, H. L. Bitter and O. G. Hankins.—p. 575.
Effect of Artificially Induced Hyperthermia on Electrocardiogram of Dog. H. M. Geller, L. H. Nahum, R. S. Sikand and H. Levine.—p. 584.
Effects of Hypoxia on Renal Tubular Function. D. R. Axelrod and R. F. Pitts.—p. 593.
Renal Excretion of Sodium and Water in Man as Affected by Prehydration, Saline Infusion, Pitressin and Thiomerin. M. Ladd.—p. 602.

Journal of Aviation Medicine, St. Paul

22:439-558 (Dec.) 1951

Visual and Orthopedic Defects in Civil Airmen. D. M. Gilford and W. R. Stovall.—p. 442.
Noise Problems Associated with Aircraft Maintenance. H. O. Parrack and D. H. Eldredge.—p. 470.
*Acoustic Trauma in Aircraft Maintenance Workers. E. Guild.—p. 477.
Auditory Perception in Noise. J. Tonndorf.—p. 491.
Safe Human Tolerance for High Concentrations of CO Over Short Periods of Time. A. L. Hall, C. A. Patterson and J. K. Colehour.—p. 501.
After Effects of Intermittent Positive Radial Acceleration. R. C. Wilson, G. L. Bryan, G. A. Green and others.—p. 509.
Aviation Medicine in Evaluation of New Naval Aircraft. R. A. Bosee and P. W. Gard.—p. 518.
Lethality of Simulated Altitude for Rabbits, Normal and Pretreated with Tetraethyl Pyrophosphate of Dibenamine. R. O. Bauer and J. Gourzis.—p. 524.
Personality Research in Naval Aviation Selection. J. F. Snyder.—p. 530.
*Further Studies on Effectiveness of Various Drugs Against Airsickness. H. I. Chinn, O. H. Waltrip and H. W. Massengale.—p. 535.

Acoustic Trauma in Aircraft Maintenance Workers.—Little attention has been given to the hearing acuity of men who do maintenance work on aircraft, although during power checks noise intensities exceed 130 db. on many reciprocating engine aircraft and 140 db. on jet-powered aircraft. Pure tone audiograms and histories of noise exposures and subjective reactions to noise were recorded on 354 aircraft maintenance workers. One-half (177) of the men worked on conventional and one-half on jet planes. The records were compared to those of 368 men who worked in relatively quiet environments and those of 139 experienced pilots. It was found that although many aircraft maintenance men retain normal auditory acuity despite years of exposure to intense noise, the average person has some loss greater than that expected without exposure to noise. In mechanics who suffer significant impairments the severity tends to be greater and the age of onset earlier than among men who have similar losses without exposure to excessive noise. Potentially, at least, jet engine noise influences auditory acuity more than the noise of reciprocating engines. Jet engine noise is so irritating that it affects the efficiency of some men. Many of the hearing impairments were not handicapping nor did they necessarily reflect permanent damage; however, they do show that among aircraft maintenance men, as among pilots and test cell workers, acoustic trauma is a problem.

Drugs Against Airsickness.—The effectiveness of scopolamine hydrobromide and of diphenhydramine (benadryl®) in preventing motion sickness has been well documented. It has also been reported that a mixture of these two drugs provides excellent protection with smaller amounts of each one. Recently, significant protection against motion sickness has been obtained with other drugs. Scopolamine aminoxide (scopodex) hydrobromide tested by the simulated turbulence technique was found to be superior to dimenhydrinate (dramamine®); trihexyphenidyl (artane®), an antispasmodic used in Parkinson's disease,

chlorcyclizine hydrochloride (perazil®), and 10-(α-methyl-β-dimethylaminoethyl)-phenothiazin hydrochloride ("lergigan"), both long-acting antihistaminics, have given significant protection against seasickness. It was decided to compare these preparations with the scopolamine-diphenhydramine mixture. The efficacy of the drugs was tested during regular navigation training flights. In a comparison in over 3,000 subjects, this mixture consistently gave protection against airsickness equal to or greater than any other preparation tested. The side-effects of this preparation were minimal, consisting mainly of a slight increase in blurred vision and dry mouth. The mixture was superior to 2 mg. of scopolamine aminoxide and to 50 mg. of chlorcyclizine hydrochloride. It showed somewhat better protection against nausea and vomiting than did the scopolamine aminoxide-diphenhydramine combination, although this was not statistically significant. There was no difference in the effectiveness of "lergigan" and of the scopolamine-diphenhydramine mixture. Further comparison of these two preparations would be desirable, since the duration of action of "lergigan" has been reported to be long, which would enhance its value in long flights.

Journal of Clinical Investigation, Cincinnati

30:1307-1440 (Dec. [Part I]) 1951

Pathogenesis of Acute Renal Failure Associated with Traumatic and Toxic Injury: Renal Ischemia, Nephrotoxic Damage and Ischemuric Episode. J. Oliver, M. MacDowell and A. Tracy.—p. 1307.

30:1441-1580 (Dec. [Part II]) 1951

Venous Congestion of Extremities in Relation to Blood Volume Determinations and to Mixing Curves of Carbon Monoxide and T-1824 in Normal Human Subjects. E. Brown, J. Hopper Jr., J. J. Sampson and C. Mudrick.—p. 1441.

•Quantitative Antibody Studies in Man. I. Effect of Adrenal Insufficiency and of Cortisone on Level of Circulating Antibodies. D. L. Larson and L. J. Tomlinson.—p. 1451.

Renal Response to Intravenous Injection of Sodium Chloride Solutions in Man. B. Crawford and H. Ludemann.—p. 1456.

Velocity of Distribution of Sucrose Between Plasma and Interstitial Fluid, with Reference to Use of Sucrose for Measurement of Extracellular Fluids in Man. N. Deane, G. E. Schreiner and J. S. Robertson.—p. 1463.

Intracellular Water in Man. N. Deane.—p. 1469.

Total Red Cell Volume, Plasma Volume, and Sodium Space in Congestive Heart Failure. T. C. Prentice, N. I. Berlin, G. M. Hyde and others.—p. 1471.

Studies in Fat Metabolism. G. D. Michaels, S. Margen, G. Liebert and L. W. Kinsell.—p. 1483.

Effects of Adrenaline upon Renal Function and Electrolyte Excretion. W. E. Jacobson, J. F. Hammarsten and B. I. Heller.—p. 1503.

Quantitative Relationship Between Water Content of Skin and Inflammation Produced by Chemical Irritants. H. V. Weiss, V. E. Siler and P. R. Buechler.—p. 1507.

Ferrokinetics in Normal Persons and in Patients Having Various Erythropoietic Disorders. R. L. Huff, P. J. Elmlinger, J. F. Garcia and others.—p. 1512.

Effect of Adrenocorticotrophic Hormone (ACTH) on Cerebral Blood Flow and Metabolism. J. F. Schieve, P. Scheinberg and W. P. Wilson.—p. 1527.

Treatment of Nephrosis with Pituitary Adrenocorticotrophin. J. A. Luetscher Jr., Q. B. Deming and B. B. Johnson.—p. 1530.

Hemagglutinins and Hemolysins for Erythrocytes Sensitized with Tuberculin in Pulmonary Tuberculosis. W. H. Hall and R. E. Manion.—p. 1542.

Effect of Adrenal Insufficiency and Cortisone on Circulating Antibodies.—This paper presents observations on the effect of adrenal insufficiency and of cortisone on antibody titers in man. The patients serving as controls had peptic ulcer or arteriosclerotic heart disease. Desoxycorticosterone acetate was given to four of the five patients with adrenal insufficiency, who had the typical symptoms of Addison's disease. The cortisone-treated group were patients with rheumatoid arthritis receiving 200 mg. of the drug by mouth three times each week. Cortisone treatment was started at least two weeks before immunization and was continued throughout the test period. The method of Heidelberger and MacPherson was used for quantitative determination of precipitable antibody nitrogen. Type-specific capsular polysaccharides of pneumococcus types 1 and 2 were used as antigens. Since complement and C-antibody may add nitrogen to specific precipitates, these were removed before the analysis of the specific precipitates was carried out. The authors say that C-antibody was present in the serum of the 12 controls. The C-antibody remained relatively constant in spite of sizeable changes in antibody to the capsular polysaccharides. The antibody response of individuals varied considerably. A marked response to one antigen is not necessarily accompanied by a similar response to another antigen in the same person. Maximum antibody titers are usually achieved two weeks following immunization. The five patients with adrenal insufficiency did not demonstrate any impairment of antibody formation. The eight patients with untreated rheumatoid arthritis and nine patients with cortisone-treated rheumatoid arthritis had similar antibody responses when observed for four weeks. Two patients with rheumatoid arthritis with previously elevated antibody titers showed no change in these titers on administration of cortisone.

Journal of Experimental Medicine, New York

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Growth Curve of Lansing Strain of Poliomyelitis Virus in Central Nervous System of Mouse. J. D. Ainslie.—p. 1.

Growth Curve of Lansing Strain of Poliomyelitis Virus in Mice: Effect of Sodium Monofluoroacetate and Methionine Sulfoximine on Early Phase of Growth of Virus. J. D. Ainslie.—p. 9.

Observations Concerning Production and Excretion of Cholesterol in Mammals: V. Relation of Biliary Retention of Cholesterol, Distention of Biliary Tract, Shunting of Bile to Vena Cava, and Removal of Gastro-Intestinal Tract to Hypercholesteremia Consequent on Biliary Obstruction. S. O. Byers and M. Friedman.—p. 19.

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Mucoprotein Derived from Human Urine Which Reacts with Influenza, Mumps, and Newcastle Disease Viruses. I. Tamm and F. L. Horsfall Jr.—p. 71.

Electrophoretic Examination of Urinary Mucoprotein Which Reacts with Various Viruses. G. E. Perlmann, I. Tamm and F. L. Horsfall Jr.—p. 99.

Group A Streptococcus Polysaccharide: Studies on Its Preparation, Chemical Composition, and Cellular Localization After Intravenous Injection into Mice. W. C. Schmidt.—p. 105.

Journal of Immunology, Baltimore

68:1-114 (Jan.) 1952

Inhibition of Growth of Viruses in Chick Embryo by Aromatic Diamidines. M. D. Eaton, C. G. Levenson and M. Perry.—p. 1.

Protease Activation in Immune Reactions. W. B. Geiger.—p. 11.

Immunochemical Studies on Blood Groups: XII. Preparation of Blood Group Substances from Bovine Stomach Linings and Comparison of Their Chemical and Immunochemical Properties with Those of Blood Group Substances from Other Species. S. M. Beiser and E. A. Kabat.—p. 19.

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Paradoxical Effect of Congo Red on Toxicity of Streptolysin S for Mice. K. Rosendal and A. W. Bernheimer.—p. 53.

Effect of Human Serum upon Agglutination of Enzyme-Treated Erythrocytes. R. E. Hoyt and H. Zwicker.—p. 61.

Hemagglutination by Tularemia Antisera: Further Observations on Agglutination of Polysaccharide-Treated Erythrocytes and Its Inhibition by Polysaccharide. G. G. Wright and R. J. Feinberg.—p. 65.

Fate in Rabbits of Intravenously Injected I^{131}-Iodoovalbumin. F. Haurowitz and C. F. Crampton.—p. 73.

Susceptibility of Irradiated Mice to Infection as Function of Post-Irradiation Time. I. L. Shechmeister, V. P. Bond and M. N. Swift.—p. 87.

Effect of Trypsin on Hemagglutination by Murine Encephalomyelitis Virus (GDVII). M. C. Morris.—p. 97.

Immunization of Laboratory Workers with Purified Trivalent Equine Encephalomyelitis Vaccine. F. D. Maurer, K. L. Kuttler, R. H. Yager and A. Warner.—p. 109.

Journal of Nervous and Mental Disease, New York

115:1-94 (Jan.) 1952

Disintegration of Central Autonomic Regulation During Fatigue and Its Reintegration by Psychosensory Controlling Mechanisms: I. Disintegration. Pupillographic Studies. O. Lowenstein and I. E. Lowenfeld.—p. 1.

Pragmatic Approach to Control of "Chronic Alcoholism." C. J. Katz.—p. 22.

Studies in Hypertension: I. Technics and Control Data. Central and Autonomic Nervous System Reactions of Normal Adults to Sensory and Ideational (Frustration) Stimulation. H. Jost, C. J. Ruilmann, T. S. Hill and M. J. Gulo.—p. 35.

Duration of Convulsions in Rats as Functions of Intensity, Duration and Cumulative Effects of Electroshock Stimulation. J. C. Townsend, R. W. Russell and R. A. Patton.—p. 49.

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J. Neuropathology & Exper. Neurology, Baltimore

11:1-102 (Jan.) 1952

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Silver Studies of Degenerating Thalamo-Cortical Connections. A. Vaz Ferreira.—p. 44.
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Experimental Study of Post Mortem Alterations in Neurons of Central Nervous System. R. S. Koenig and H. Koenig.—p. 69.
Dissimilar Lesions of Nervous System: Brain Tumor and Syringomyelia. W. W. Kaelber.—p. 79.

J. Pharmacology & Exper. Therap., Baltimore

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Chronic Tolerance Studies on β-Diethylaminoethyl Xanthene-9-C-Carboxylate Methobromide (Banthine). H. B. Freese, W. E. Hambourger, L. D. Calvin and D. M. Green.—p. 54.
Respiratory Effects of Potent Hypotensive Derivatives of Veratrum. L. Mosey and A. Kaplan.—p. 67.
Emetic Properties of Veratrum Derivatives. E. D. Swiss.—p. 76.
Prolongation of Anticoagulant Action of Heparin with Procaine and Butacaine Conjugates. T. A. Loomis, J. E. Jesseph and R. E. Beyer. —p. 87.

Journal of Urology, Baltimore

67:1-128 (Jan.) 1952

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Urologic Aspects of Arterial Hypertension. T. B. Wayman and E. B. Ferris.—p. 37.
Peripelvic Lipoma. S. Immergut and Z. R. Cottler.—p. 50.
Squamous Cell Carcinoma of Renal Pelvis. V. H. Youngblood and J. E. Kicklighter.—p. 54.
Biopsy of Kidney for Suspected Neoplasm. H. M. Weyrauch, H. L. Wanless, J. L. Goebel and K. G. Scott.—p. 60.
Bilateral Renal Agenesia. H. Levin.—p. 86.
Metastatic Melano-Epithelioma of Urinary Bladder: Report of Case. R. P. Morrow Jr., L. B. Woolner and J. L. Emmett.—p. 92.
Suprapubic Transvesical Prostatectomy with Primary Closure of Bladder Using Oxidized Cellulose: Analysis of 100 Cases. R. C. Thumann Jr. and G. D. Stump.—p. 95.
Evaluation of Oxycel-Bag Catheter Technique in Suprapubic Prostatectomy. W. J. Baker and E. C. Graf.—p. 101.
*Retropubic Prostatectomy and Inguinal Hernia Repair. L. W. Riba and W. H. Mehn.—p. 106.
Osteitis Pubis Following Retropubic Prostatectomy. C. K. Pearlman. —p. 117.
*Mortality of Various Methods of Prostatectomy. J. E. Byrne.—p. 121.
Ovarian Cyst and Uremia. J. W. Cherry.—p. 126.

Retropubic Prostatectomy and Hernia Repair.—Riba and Mehn performed retropubic prostatectomies on 14 patients during the past 18 months. Eleven of the operations were done for adenomatous hyperplasia and three for carcinoma of the prostate. The authors were favorably impressed with the retropubic operation. It provides good access except in a very deep pelvis, when a suprapubic enucleation may be preferable. The bladder and peritoneum are undisturbed and this results in less trauma, shock, and hemorrhage. Extra and intracapsular hemorrhage can be controlled, and adenomatous tags removed under direct vision. The authors found that the transverse abdominal incision is of value in retropubic procedures and is especially useful in obese patients. They also found that a satisfactory repair of inguinal hernias may be done in conjunction with a retropubic prostatectomy. The method used is similar to the McVay procedure, in that the superior pubic (Cooper's) ligament is utilized.

Mortality of Various Methods of Prostatectomy.—In this study 347 prostatectomies performed by six surgeons at one hospital during a 10 year period are reviewed. Conventional methods were used: transurethral electrocautery resection in 202 cases; the one stage suprapubic operation in 62 cases; the two stage suprapubic operation in 81 cases; and perineal prostatectomy in two cases. Transurethral prostatectomy was the method of choice in the majority of cases, regardless of the age of the patient. The mortality rate and hospital stay were less with transurethral resection than with any other method. A sufficient number of suprapubic prostatectomies are still being done to indicate that it is the procedure of choice in selected cases. A comparison of mortality figures before and after the introduction of antibiotics shows a lower mortality for the one stage suprapubic operation, but the antibiotics have not influenced the mortality of the two stage suprapubic operation. There has been little or no change in the length of hospitalization for patients undergoing suprapubic prostatectomies.

Maryland State Medical Journal, Baltimore

1:1-48 (Jan.) 1952

Activities of the Medical and Chirurgical Faculty. W. D. Wise.—p. 3.
The Maryland Advisory Committee to Selective Service—A Report. R. W. Graham Jr.—p. 8.
Maryland Civil Defense Medical Services. R. H. Riley and H. G. Fritz. —p. 10.

MEDICOLEGAL SYMPOSIUM—DRUG ADDICTION

Pharmacology of Drugs Causing Addiction. E. H. Dearborn.—p. 21.
Prosecution of Drug Cases. A. Sodaro.—p. 25.

Mental Hygiene, Albany, N. Y.

36:1-176 (Jan.) 1952. **Partial Index**

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When Doctors Disagree. J. C. Whitehorn.—p. 25.
Psychodrama in a State Hospital. M. M. Parrish and J. Mitchell.—p. 33.
Psychiatric Case Studies with Teachers. M. Kanzer.—p. 44.
Interracial Practices in Mental Hospitals. R. B. Stevens.—p. 56.
Mental Health of the Three Little Monkeys. W. W. Argow.—p. 121.

Michigan State Medical Society Journal, Lansing

51:1-144 (Jan.) 1952

Our Responsibility and Opportunity. J. W. Cline.—p. 33.
Doctors and Federal Medical System: Problem, Findings and Solution. R. C. Page.—p. 41.
Subtotal Gastrectomy with Postoperative Complications: Case Report. H. C. Saltzstein and S. R. Scheinberg.—p. 49.
Painful States of Shoulder and Arm: Diagnosis and Treatment. R. C. Bassett and S. J. O'Connor.—p. 55.
Principles and Problems in Psychotherapy with Veterans. T. V. Hoagland. —p. 62.
Know How to Live. W. T. Reeves Jr.—p. 65.

New England Journal of Medicine, Boston

246:41-76 (Jan. 10) 1952

New Concept of Etiology of Megaloureters. O. Swenson, H. E. MacMahon, W. E. Jaques and J. S. Campbell.—p. 41.
Deaths from Poisoning: Massachusetts, 1938-1948. M. Moore, L. Alexander and J. Ipsen Jr.—p. 46.
*Aureomycin in Treatment of Diffuse Peritonitis. A. M. Rutenburg, S. W. Jacob, F. B. Schweinburg and J. Fine.—p. 52.
The Tuberculous Diabetic Patient. M. A. Ferrara.—p. 55.
Use of ACTH and Cortisone in Dermatology. J. G. Downing.—p. 56.

Aureomycin in Diffuse Peritonitis.—This paper reviews the therapeutic response to aureomycin of 59 patients with diffuse peritonitis of intestinal origin. Aureomycin hydrochloride buffered with sodium glycinate was administered intravenously during the acute phase of the disease. The usual dosage was 500 mg. of the drug dissolved in 500 cc. of isotonic sodium chloride or dextrose solution twice daily. Patients with fulminating infections received 500 mg. of aureomycin every six to eigth hours. After the peritonitis had been brought under control, the antibiotic was given orally. The response was excellent in 47 patients, doubtful in 6, and poor in 1. Five other patients died, although in two the infection had been controlled. In most cases the convalescence was rapid and wound healing as fast as if no infection had been present. The results indicate that aureomycin alone is more effective than penicillin alone and at least as effective as aureomycin and penicillin combined. Eight patients responded to aureomycin after penicillin had failed to control the infection; two others recovered only when aureomycin was added to initial penicillin therapy. Those patients who failed to respond satisfactorily to aureomycin alone did not improve after combined antibiotic therapy or massive

penicillin therapy alone. Aureomycin produced signs of gastrointestinal toxicity in the form of stomatitis, esophagitis, and diarrhea in one-fifth of the patients, but no other toxic effects were noted. The authors feel that aureomycin is superior to penicillin in the treatment of peritonitis.

New York State Journal of Medicine, New York

52:113-256 (Jan. 15) 1952

Uremia: Some Clinical Aspects and Medical Treatment. M. E. Holmes. —p. 175.
Relationship Between Certain Types of Renal Damage and pH of Urine. J. U. Schlegel.—p. 180.
Diagnosis and Treatment in Traumatic Injuries of Bladder and Urethra. R. B. Laury.—p. 187.
Peristalsis of Upper Urinary Tract as Demonstrated by New X-Ray Technic: Preliminary Report. T. H. Johnson.—p. 189.
Lymphomatous Involvement of Genitourinary Tract. H. L. Boyd.—p. 197.
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Urologic Problems in Uremic Patient: Their Investigation and Management. J. H. Harrison.—p. 209.
Retropubic Prostatectomy: Survey of Indications and Results of 119 Cases. G. E. Slotkin.—p. 220.
2-Amino-1-(*p*-Methylphenyl)-Propane (Aptrol) as Anorexigenic Agent in Weight Reduction. E. P. Gelvin and T. H. McGavack.—p. 223.
Effectiveness of Hydroxy-Phenyl Cinchoninic Acid in Rheumatoid Arthritis. M. E. Ehrlich, S. Berkowitz, S. G. Carp and others.—p. 227.
Total Gastrectomy: Operative Morbidity and Mortality in Series of 33 Consecutive Cases. G. McNeer and L. Bowden.—p. 231.
Delays and Errors in Diagnosis and Treatment of Endometrial Carcinoma. W. F. Finn.—p. 235.

52:257-384 (Feb. 1) 1952

SYMPOSUM: CLINICAL ASPECTS OF DISEASES OF LUNGS

Tuberculosis. J. M. Blake.—p. 293.
Bronchogenic Carcinoma. W. F. Bugden.—p. 298.
Suppurative Diseases of Lungs and Bronchi. A. A. Ehler.—p. 300.
Contribution of Naval Experience to Human Nutrition. C. M. McCay. —p. 304.
Recollections of Dr. William Henry Welch—A Great Teacher. E. H. Hume.—p. 309.
Physical Medicine for the Neurologic Patient. A. L. Watkins.—p. 315.
Combined Use of Cortisone and Physical Therapy in Treatment of Arthritic Deformities. W. B. Snow and J. A. Coss.—p. 319.
After-Care for the Poliomyelitis Patient. M. Hoberman.—p. 323.
Experimental Revascularization of Rheumatic Myocardium: Preliminary Report A. N. Gorelik.—p. 327.
Surgical Treatment of Diverticulitis of Sigmoid Colon. J. P. West. —p. 329.
Intra-Articular Injections in Osteoarthritis. A. Weissman.—p. 333.
Outpatient Management of Peroral Endoscopy Cases. M. S. Lloyd and M. A. Juster.—p. 337.
Planning New Obstetric Pavilion in the North Country Community Hospital, Glen Cove, New York. R. S. Millen.—p. 340.
Value of Roentgenographic Studies in Treatment of Pilonidal Disease. A. J. Caliendo.—p. 343.
*Triethylene Melamine in Treatment of Hodgkin's Disease and Other Lymphomas. A. Rottino.—p. 346.

Triethylene Melamine in Hodgkin's Disease and Related Disorders.—Rottino discusses his experiences with triethylene melamine in 71 patients with Hodgkin's disease treated in one year. Related disorders were lymphosarcoma in 8, chronic lymphatic leukemia in 8, chronic myeloid leukemia in 6, and acute leukemia in 2. The drug was administered orally as a single 5 mg. tablet to fasting patients one hour before breakfast. In several instances one tablet (5 mg.) was given once per week until symptomatic relief appeared; in other instances 5 mg. were given daily for two to three days and repeated weekly as long as symptoms of the disease persisted. The total dosage varied from 15 to 105 mg., and the large doses were distributed over a period of three months. There was no immediate toxic effect, but in several cases there was loss of appetite, nausea, and vomiting either several hours or 24 hours later. Adverse effects were most noticeable in the hematopoietic system; in many instances there was a sharp decrease in the red and white blood cells and thrombocytes. In patients who showed hematologic depression the bone marrow was aplastic. The average dose producing aplasia was about 45 mg. or more, administered in a period of three weeks. As a rule, the drop in the blood count occurred from two to three weeks after the last dose. In some instances the drop in thrombocytes was accompanied by purpura, bleeding from the gums, headache, and bleeding from the bowels. These hematopoietic complications were controllable by multiple transfusions. Despite marked leukopenia, infections did not occur, probably because of the free use of antibiotics. The results were most impressive in lymphatic leukemia but were less so in lymphosarcoma and chronic myeloid leukemia. In Hodgkin's disease the effectiveness varied, and, in general, the degree could be correlated with the stage of advancement of the disease. Since the drug is toxic, overdosage must be guarded against. An initial dose of 15 mg. over a period of three days may be given safely and in the average case will induce a remission. The fact that it can be given orally and that the patient does not necessarily have to be hospitalized is a great advantage.

Pennsylvania Medical Journal, Harrisburg

54:1113-1240 (Dec.) 1951

Obstetrics in General Practice. C. L. Randall and R. W. Baetz.—p. 1129.
Training the General Practitioner for His Job in Public Health. J. P. Hubbard.—p. 1139.
Nutrition in Liver Disease. R. Tarail.—p. 1144.
Preoperative and Postoperative Nutrition. M. G. Wohl and C. R. Shuman. —p. 1150.
Treatment of Parkinson's Syndrome: Some Practical Considerations. J. C. Yaskin.—p. 1156.

Plastic & Reconstructive Surgery, Baltimore

8:417-504 (Dec.) 1951

Failure of Adrenal Cortical Hormones to Prolong Survival of Homologous Skin Grafts. P. A. Weisman, A. Wight, W. C. Quinby Jr., and B. Cannon.—p. 417.
Failure of Heat Treatment to Prolong Survival of Skin Homografts in Guinea Pigs: Pilot Experiment. P. Weisman and B. Cannon.—p. 428.
Elephantiasis of Lower Limbs: Treatment of Dermo-Fibro-Lipectomy Followed by Free Skin Grafting. R. Farina.—p. 430.
Anatomical Relationship of Lateral Nasal Cartilage to Nasal Bone and Cartilaginous Nasal Septum. B. R. Straatsma and C. R. Straatsma. —p. 443.
Approach to Repair of Extensive Lacerations of Wrist. J. R. Connelly. —p. 456.
More Plastic Incision for Radical Neck Dissections. C. G. Fraser.—p. 465.
New Instrument for Removal of Tattoos. L. Meltzer.—p. 469.
Follow Up on Labial Transplant for Nipple Loss. H. B. Thale.—p. 471.

Postgraduate Medicine, Minneapolis

11:1-82 (Jan.) 1952

Chronic Constrictive Pericarditis: Practical Discussion. M. Dressler. —p. 1.
Detection of Dangerous Paranoid Patient. I. Stevenson and R. A. Matthews.—p. 12.
Antibiotic and Sulfonamide Therapy in Communicable Diseases. S. Karelitz and N. Schifrin.—p. 17.
General Anesthesia for Dental Surgery. R. P. Bergner and R. M. Herd. —p. 26.
Migraine. A. P. Friedman, I. Karron and N. de Sola Pool.—p. 33.
Fibrosarcoma of Extremities. W. P. Kleitsch.—p. 41.
*Serum-Sickness Type of Penicillin Reactions, Treated with Sodium Dehydrocholate. L. Pelner and S. Waldman.—p. 49.
Treatment of Acute Mastoiditis. H. C. Ballenger.—p. 56.
Management of Abortion. G. E. Judd.—p. 58.
Antepartum Care. B. J. Hanley.—p. 62.
Speech Disorders in Children. S. F. Brown.—p. 65.
Management of Anemia in Childhood. M. I. Pierce.—p. 68.
Management of Oral Anticoagulant Therapy. S. Shapiro.—p. 73.

Serum-Sickness Type of Penicillin Reactions.—The occurrence of a reaction simulating serum disease is reported in six men between the ages of 22 and 65 who had been treated with penicillin for severe sore throat, carbuncle on the thigh, phlebitis complicating virus pneumonia, severe Vincent's infection of the mouth, and severe pharyngitis, respectively. The serum-sickness type of reaction to penicillin is characterized by an incubation period of from 7 to 14 days and usually consists of urticaria, angioneurotic edema, itching, fever, migratory joint pains, and joint swelling. Occasionally a purpuric rash is a symptom. One of the authors' patients had an "occult" type of reaction, without a rash, requiring differential diagnosis from many infectious diseases. Gratifying results were obtained with 5 cc. of sodium dehydrocholate (20% solution) given intravenously every day or every other day, depending on the severity of the penicillin sensitivity. In addition, one tablet of dehydrocholic acid (0.24 gm.) was given orally three times daily. In one case the oral method of administration was sufficient to improve the condition. Desoxycholic acid is today the starting point for the synthesis

of cortisone in vitro. Cortisone is an effective drug for the treatment of penicillin reactions, and the results obtained with sodium dehydrocholate proved that it is also effective. There is evidence that dehydrocholic acid has at least one of the functions of adrenocortical steroids, that of reducing increased capillary permeability. Increased capillary permeability may be the basis for some allergic reactions.

Psychoanalytic Review, Albany, N. Y.

39:1-114 (Jan.) 1952. **Partial Index**

Successful Treatment of 40-Year-Old Passive Homosexual Based on Adaptational View of Sexual Behavior. J. S. Poe.—p. 23.
Imitation and Avoidance of Duodenal Ulcer. R. W. Pickford.—p. 53.
Acting Out of Transferences. N. Roth.—p. 69.
Elucidation of Spontaneous Sensory and Motor Phenomena During Hypnoanalysis. J. M. Schneck.—p. 79.
Sexual Basis of Social Prejudice. R. Seidenberg.—p. 90.

Review of Gastroenterology, New York

19:1-100 (Jan.) 1952

Use of ACTH in Treatment of Ulcerative Colitis. C. W. Wirts and J. L. Carroll.—p. 13.
Association of Tuberculosis with Gastroenteritis: Problems of Gastroenterologist in Tuberculosis. A. X. Rossien.—p. 29.
*Role of Phrenic Nerve in Vagotomy and in Gastrointestinal Mechanisms. H. Necheles and N. C. Jefferson.—p. 39.
Amebic Dysentery. H. B. Shookhoff.—p. 48.
Single and Multiple Polyps or Adenomas of Colon and Rectum—Management. R. R. Best.—p. 57.
Hemorrhoids: Etiology, Pathology and Treatment. (Part III). R. V. Gorsch.—p. 67.

Role of Phrenic Nerve in Vagotomy.—Bilateral vagotomy just below the hilus of the lungs was performed on dogs, and led to dilatation of the stomach and constant vomiting. In another series of dogs both vagus nerves and the left phrenic nerve were sectioned. In these dogs no vomiting occurred, the food left the stomach within a very short period of time, and the dogs appeared normal, except that the stomach was high in the left chest and the air bubble in the fundus was relatively large. No ulcers or serious disturbances were noted in the stomach or intestine of these animals. In performing vagotomy in the dog, complete interruption of the vagus suppply to the stomach could not be achieved by supra or by infradiaphragmatic vagotomy. The profound atony of the stomach that is usually seen following bilateral vagotomy was produced also by simple lifting of the vagus nerves in the chest of the dog. The authors therefore believe that the atony and decrease of the function of the stomach, and the disappearance of ulcer pain following vagotomy, are not due as much to section of the vagus nerves as to a profound shock into which the stomach is put by manipulation or by trauma to the vagus fibers. During their studies of bilateral vagotomy in the dog, cardiospasm was observed in a number of animals. In none of the phrenectomized or vagotomized and phrenectomized dogs was a disturbance of the cardia observed. Additional studies of the effect of left phrenicotomy on the cardia in the dog revealed that it did not produce cardiospasm and that it was able to overcome the cardiospasm often following bilateral vagotomy. Double infradiaphragmatic vagotomy, gastroenterostomy, and left phrenic crush was performed with excellent results in six patients. The patients were out of bed on the first day after operation; none of them vomited, none of them had distention, their stomachs emptied in a short period, and they were all back to work within a few weeks after operation. Roentgenograms before and after operation demonstrated that the stomach moved up into the left chest. Left side phrenic interruption was performed in a patient who had been suffering from cardiospasm for the last five years. The patient lost the cardiospasm, was able to eat without any disturbance, and regained his weight within a few weeks. Section of the phrenic nerve has profound effects on gastrointestinal mechanisms. It shortens the emptying time of the stomach, probably by raising the stomach so that the axis between cardia and pylorus is straightened. Cardiospasm that may follow vagotomy for peptic ulcer or cardiospasm by itself can be overcome by section or crushing of the left phrenic nerve in the neck. Hiccups can be interrupted in man by crushing of both phrenic nerves in the neck.

U. S. Armed Forces Med. J., Washington, D. C.

3:1-170 (Jan.) 1952

Neurosurgery in World War II. W. M. Craig.—p. 1.
Psychoneuroses: Military Applications of Follow-Up Study. N. Q. Brill and G. W. Beebe.—p. 15.
*Frostbite in Korean Casualties. L. G. Bell, L. H. Stahlgren and B. D. Sherer.—p. 35.
Epidemic of Rheumatic Fever in Japan and South Korea. R. E. Blount, J. A. Orbison, A. P. Long and G. N. Schuhmann.—p. 43.
The Royal Army Medical Corps Tradesman. T. P. Buist.—p. 53.
Terramycin in Tuberculous Otitis Media. L. L. Titche.—p. 63.
Intestinal Obstruction. M. N. Jensen and I. K. Ettman.—p. 67.
Combined Pulmonary Tuberculosis and Carcinoma of Lung. A. S. Hambly Jr.—p. 75.
Cold Injuries with Emphasis on Frostbite: Preliminary Report. K. D Orr and D. C. Fainer.—p. 95.
New Local Treatment for Burns. P. E. Spangler.—p. 105.
Combined Streptomycin-Tuberculin Therapy in Pulmonary Tuberculosis: Pilot Study. E. C. Jacobs and J. R. Vivas.—p. 115.
Adenocarcinoma of Appendix. B. R. McCampbell and E. H. Dickinson.—p. 125.
Acne Vulgaris and Urinary 17-Ketosteroids in Young Men. C. B. White, A. Peterson and J. C. Neff.—p. 131.
Paranasal Sinuses: Radiographic Technic. H. A. Vinson.—p. 139.
Chylous Ascites of Unknown Cause. L. W. Olechowski and J. H. Froyd.—p. 143.
Salicylate Intoxication in Children. A. C. Dietrick, H. L. Guard and L. J. Geppert.—p. 149.

Frostbite in Korean Casualties.—The 150 patients reported were of an average age of 21 years, and most of them had been dressed comfortably for cold weather. Footgear consisted of waterproof rubber boots with removable inner soles. Over 75% wore two pairs of woolen socks and most of the remainder wore two woolen pairs and one cotton pair. The enemy attacked with overwhelming force toward the end of November, 1950, when temperatures ranged between —20 and —30 F. The retreating Marines were forced to fight their way toward the coast with few fires, no warming tents, and no warm food. Constantly wet skin involves an increased susceptibility to cold because of its greater conductivity. Over 60% of the victims were frostbitten while pinned down by enemy fire after a long march. They were forced into cramped positions in foxholes where they remained inactive with their feet lying in snow and their socks wet from perspiration. Proper foot care (change into dry socks, massage, and warming with body heat) before the wet footwear froze would have prevented or lessened the severity of the frostbite, but there was rarely time for such measures. Those who were wounded were generally the most severely frostbitten. It is probable that the reflex vasoconstriction from the wounds contributed to the intensity of the local ischemia, thereby increasing the severity of the permanent tissue changes. Other factors such as constricting bandages and immobilization of the part by splinting aggravated the circulatory stasis, and therefore the ischemia. Nearly 50% of the men experienced no symptomatic evidence of frostbite, but it was detected by inspection that revealed discoloration, painless blisters, or swelling of the part. Residual symptoms were not incapacitating, but were present in 95% of the series. Hyperhidrosis and paresthesias in response to temperature changes were the commonest of these. Initial treatment was begun an average of five and one-half days after frostbite was incurred. It consisted of complete bed rest with elevation of the injured part, conservative daily débridement, and intermittent soaking in saline solution. Wet dressings, antibiotics, paravertebral blocks, and grafting were used. Eighteen patients lost significant amounts of tissue, and four of these required major amputations.

Western J. Surg., Obst. & Gynecology, Portland, Ore.

60:1-48 (Jan.) 1952

Surgical Treatment of Carcinoma of Cervical and Upper Thoracic Esophagus. L. A. Brewer III.—p. 1.
Pelvic Endometriosis. H. C. Stearns.—p. 13.
Acute Terminal Ileitis. R. O'Callaghan.—p. 17.
Relief of Colostomy Stricture. D. B. Seabrook.—p. 20.
Fluid and Electrolyte Management in Pediatric Surgery. H. A. Frank, T. N. Hastings and T. W. Brophy.—p. 25.
Flexor Tendon Injuries. R. C. Miller.—p. 32.
Use of Chloroamphenicol in Obstetric Infections. E. S. Taylor and W. C. Scott.—p. 36.
Concerning Anesthesia for Cesarean Section. M. L. Bernstine.—p. 39.

FOREIGN

Archives des Maladies du Coeur, Paris

44:1057-1152 (Dec.) 1951. **Partial Index**

*Angiocardiography in Diagnosis of 200 Cases of Congenital Cardiopathies. P. Soulié, A. Piton and M. Touche.—p. 1057.
Electrocardiogram of Avascular Subacute Pulmonary Heart Disease. F. C. Arrillaga and L. de Soldati.—p. 1088.
Hemodynamic Study of 10 Cases of Isolated Persistent Patent Ductus Arteriosus. G. Voci, M. Touche and F. Joly.—p. 1103.

Angiocardiography in Diagnosis of Congenital Cardiopathies.—Angiocardiography became essential when effective surgical procedures for congenital heart disease were introduced, since definite diagnosis is necessary before surgery is undertaken. The surgeon requires from the cardiologist precise information in regard to the cardiac or vascular area in which he intends to operate and to anomalies that may make the procedure more difficult, such as abnormal venous return, right aortic arch, and abnormal position of the aorta or its branches. The authors do not believe that selective or regional angiocardiography should replace standard angiocardiography.

Bol. del Colegio Méd. de Camagüey

14:345-438 (July-Dec.) 1951. **Partial Index**

Thoracoplasty in Pulmonary Tuberculosis. M. Sorí Marín.—p. 347.
Study and Treatment of Eclampsia. R. A. Santayana.—p. 355.
Soft Chancroid: Statistical Study of 187 Cases. R. Simón del Blanco.—p. 373.
*Hepatitis from Homologous Serums. J. A. Pichardo Rubio.—p. 412.

Homologous Serum Hepatitis.—Pichardo Rubio applies the term homologous serum hepatitis to either syringe hepatitis or viral hepatitis when the latter is due to transfusion with blood of a donor within the period of incubation of viral hepatitis. In a period of three and one-half months 31 patients had blood transfusions at the Sanatorio de la Colonia Española de Camagüey. Follow-up observation of the patients proved that there was no complication to transfusion. In the same period a professional donor gave blood to six patients. At the end of that period he entered the hospital with virus hepatitis. Only the patient who had a transfusion 100 days before appearance of clinical symptoms of viral hepatitis in the donor did not develop the disease. All the patients who had transfusion with this donor's blood within 88 days of the appearance of clinical symptoms developed viral hepatitis. Two patients died. Three cases are described here. The period of incubation was shorter, and jaundice and the disease were more acute as the period of incubation in the donor advanced in relation to the date on which he had given blood. The symptoms and course of the disease were much more acute in the patients than in the donor. Hepatomegaly was more marked than in syringe hepatitis. The diagnosis was confirmed by the results of a liver biopsy. The three patients as well as the donor reacted well to the usual treatment of the disease, including rest, a proper diet, and injections of dextrose, liver extract, and vitamins.

British Medical Journal, London

1:119-174 (Jan. 19) 1952

*Streptomycin in Ophthalmology. A. Sorsby, J. Ungar and N. L. Bailey.—p. 119.
Clinical Features of Pneumonias Undergoing Virus Tests. G. H. Jennings.—p. 123.
Role of Statistics in Regional Hospital Planning, with Special Reference to the Birmingham Hospital Region. V. Norris.—p. 129.
Primary Tuberculous Pleural Effusion in Older Age Groups. R. F. Robertson.—p. 133.
Radiological Changes in Skull in Dystrophia Myotonica. J. E. Caughey.—p. 137.
Bullous Lesions in Leukaemia. R. Scutt.—p. 139.
*Ovarian Denervation for Ovarian Dysmenorrhoea: Review of 70 Cases. D. C. Wiseman and W. M. Thomas.—p. 141.
Epidemiology of Human Case of Bacillary Dysentery Due to Infection by Shigella Flexneri 103 Z. K. P. Carpenter and B. R. Sandiford.—p. 142.

Streptomycin in Ophthalmology.—It is generally accepted that tuberculosis of the conjunctiva, cornea, iris, and retinal veins is secondary to a general infection. This does not exclude the possibility that local therapy has some value, but does emphasize that exclusively local therapy is unlikely to prove satisfactory. In infections with gram-negative bacilli the lesion is entirely local, and local treatment may give the desired results. Sorsby and associates studied the concentrations that can be reached in the eye by the systemic and subconjunctival injection of streptomycin. They also investigated the efficacy of such therapy in experimental infection of the cornea by Pseudomonas pyocyanea, and tried to estimate its clinical value. They found that 0.5 gm. of streptomycin in 1 ml. of water is well tolerated on subconjunctival injection, and that this method of administration produces considerably higher intraocular levels than intramuscular injection. The intraocular levels are still higher and persist up to 36 hours if epinephrine 1:1,000 is the solvent. In the experimental animal a destructive Ps. pyocyanea infection of the cornea is fully controlled by one subconjunctival injection of 0.5 gm. of streptomycin in 1 ml. of epinephrine 1:1,000. For clinical purposes streptomycin to be injected subconjunctivally should be dissolved in 0.6 ml. of water to which 0.3 ml. of epinephrine 1:1,000 has been added. Clinically streptomycin is effective when used subconjunctivally in infections of the cornea due to gram-negative bacilli. As these lesions are highly destructive, early treatment is essential, and the characteristic clinical appearance of such infections facilitates early diagnosis. Streptomycin locally is also invaluable in acute conjunctivitis due to gram-negative bacilli. Systemic administration of streptomycin proved helpful in tuberculous keratitis, but gave poor results in presumably tuberculous iridocyclitis and in periphlebitis. In phlyctenular ophthalmia it tended to cut short severe attacks, and probably reduced the frequency and severity of relapses.

Denervation for Ovarian Dysmenorrhea.—That the ovary could be the source of pain in some cases of dysmenorrhea was first pointed out in 1925, and in 1939 it was suggested that a painful ovary could be rendered insensitive by denervation, an operation that is less severe than presacral neurectomy. Wiseman and Thomas describe 70 patients with ovarian dysmenorrhea in whom they performed bilateral ovarian denervation. They used a midline subumbilical paramedian incision, and subdivided the infundibulopelvic ligaments between clamps as near the ovary as possible so that all the nerve fibers might be included in the clamps. The divided ends were ligated with catgut, and care was taken, when ligating the medial pedicle, that the fallopian tube was not kinked. If the ovary tended to fall into the pouch of Douglas, the ovarian ligament was shortened by a catgut stitch. The following additional procedures were carried out: Gilliam's suspension in 12 cases, cyst resection in 34, appendectomy in 19, and myomectomy in 3. At examination six weeks after the operation 56 were cured, 12 were improved, and 2 were unchanged. In a follow-up study from six months to three years after the operation 65 of the 70 patients could be traced, and 61 were either cured or improved and 4 were unchanged. The authors resort to denervation of the ovaries only when bimanual compression of the ovaries accurately reproduces the pain, and they feel that it should be done in young women in whom appendicitis is not found at operation.

Deutsche medizinische Wochenschrift, Stuttgart

77:1-32 (Jan. 4) 1952. **Partial Index**

*New Method for Cytologic Diagnosis of Gastric Diseases. N. Henning and S. Witte.—p. 1.
Diagnosis of Menstrual Cycle from Unstained Vaginal Secretion with the Aid of Phase Contrast Microscope. O. A. Roth.—p. 4.
Case of Spotted Fever (Brill's Disease) in Northern Germany. H. Binde, S. Kramer, G. Preuss and F. Weyer.—p. 5.
Sjögren's Syndrome. W. Beiglböck and H. Hoff.—p. 7.
Treatment of Gastritis. W. Brühl.—p. 11.
Diuretic Action of Several New Derivatives of Theophylline. F. Hildebrandt.—p. 13.

Cytological Diagnosis of Stomach Diseases.—Henning and Witte point out that adaptation of Papanicolaou's method of cytological examination for examination of desquamated cells of the gastric mucosa proved difficult at first, because of the destructive effect of the gastric juice on the cells. Later biopsy specimens were obtained by means of the gastroscope and were used for the cytological examination. In this paper the authors are concerned with the results obtained by means of the "cell tamponing" method. A rubber sponge was inserted into the stomach inside of a soft stomach tube. When the tube was in

proper position in the stomach, the sponge was pushed forward by means of a mandrin. After the sponge had been brushed along the gastric wall, it was withdrawn into the tube. After removal of the tube from the stomach, the rubber sponge was washed off with isotonic sodium chloride solution, and the fluid thus obtained was centrifugated. Part of the sediment was examined at once under the phase contrast microscope, and smears were prepared from the remainder of the sediment. This technique was employed in 145 patients, including some without gastric disturbances and others with hyperacidity, achylia, pernicious anemia, or carcinoma, and the characteristics of the desquamated cells in these disorders are described. As regards the use of this "cell tamponing" method in gastric cancer, the authors say that it is most reliable in the presence of carcinoma of the esophagus and is least reliable in tumors in the region of the antrum. The method corroborates results of roentgenologic and gastroscopic examinations, and is particularly helpful in diagnosis of lesions in the region of the cardia and of the fundus.

Journal de Chirurgie, Paris

67:849-952 (Dec.) 1951

Evacuation of Contents of Stomach After Gastric Resections (Billroth I and II Operations). J.-M. Wollesen.—p. 849.
*Some Physiopharmacologic Aspects of Intra-Arterial Injections of Therapeutic Agents. J. Garrett.—p. 854.

Intra-Arterial Injections of Therapeutic Agents.—Experiments were performed on dogs with intra-arterial injections of 0.25 and 0.10 gm. of sodium *p*-sulfamidophenylamino sulfonate ("pentalom"). Results suggested that a large amount of the drug injected into the arteries passes into the tissues locally, while during the 24 hours after the injection an effective concentration of the drug in the blood of the general circulation could not even be obtained in the presence of stasis. Massive doses of chloroform then were injected intra-arterially and intravenously. Microscopic examination revealed that the hepatic and renal lesions produced in these animals were much more extensive and the mortality was higher when chloroform had been injected intravenously than when it had been injected intra-arterially. Intra-arterial injections of epinephrine and acetylcholine caused local vasomotor changes without exerting any significant effect on the arterial tension. Procaine hydrochloride, merbromin, sulfonamides, and penicillin when injected intra-arterially had no significant effect on the respiratory movements and the systemic arterial tension. The absence of a marked general effect of the drugs administered intra-arterially suggests that it will be possible to employ therapeutic agents by this route to obtain a local effect, when intravenous administration may not be possible in doses large enough to obtain the desired local effect. Additional experiments showed that intra-arterial injections of procaine hydrochloride, merbromin and sulfonamides did not exert any adverse effect on leukocytic phagocytosis, although repeated intra-arterial injections of high doses of procaine hydrochloride occasionally stimulated the phagocytic activity of the white blood corpuscles contacted by the drug. Variations in the arterial pressure were studied in dogs for one and a half hours after injections of procaine hydrochloride, merbromin, sulfanilamide, "pentalom," penicillin, distilled water and hypertonic 25:1,000 sodium chloride solution into the femoral artery and occasionally into the iliac arteries. In addition arteriograms were taken within 3 to 40 minutes of intra-arterial injections. Results showed that the drugs produced transitory vasoconstrictor phenomena in the injected artery and all its branches; these phenomena usually did not last longer than 30 minutes. Secondary vasodilatation of the arteriolocapillary network then occurred in direct proportion to the initial vasoconstriction and continued for more than 24 hours. These vasomotor phenomena were insignificant after the intra-arterial injections of distilled water, "pentalom," and penicillin, moderate after sulfanilamide injections, somewhat more pronounced after merbromin, and most pronounced after the injections of hypertonic sodium chloride solution. Procaine hydrochloride produced pronounced vasodilatation immediately after the injection without initial vasoconstriction. It is suggested that the initial vasoconstriction originates from a nervous reflex, while the secondary vasodilatation may be considered as paresis due to transitory loss of the autonomous vascular tonus. The increased capillary permeability that should be associated with this vasodilatation may facilitate passage of the drug from the vessels into the tissues, with considerable effect of the drug on the infected region. Leukocyte counts made before and after the intra-arterial injections demonstrated that the changes in the leukocytes caused by the injections may not play a significant part in the anti-infectious action of the therapeutic agents injected intra-arterially.

Lancet, London

2:113-166 (Jan. 19) 1952

Treatment of Peptic Ulcer. J. W. Todd.—p. 113.
*Intra-Ocular Acrylic Lenses After Cataract Extraction. H. Ridley.—p. 118.
Effect of Adrenal Extract on Mineral Metabolism. J. F. Tait, S. A. Simpson and H. M. Grundy.—p. 122.
*Imbibition of Fluid as Cause of Herniation of Nucleus Pulposus. J. Charnley.—p. 124.
Nisin in Experimental Tuberculosis. E. M. Bavin, A. S. Beach, R. Falconer and R. Friedmann.—p. 127.
Evaluation of Eosinophil-Count. J. N. Swanson, W. Bauer and M. Ropes.—p. 129.
Silicosis in Ball-Clay and China-Clay Industries. R. W. Thomas.—p. 133.
Penicillin-Resistant Staphylococci: Distribution Among Outpatients. G. A. C. Summers.—p. 135.

Intraocular Acrylic Lenses After Cataract Extraction.—Ridley, after reviewing the history of operations for cataract, states that since 1949 it has been possible to substitute for the opaque crystalline lens an artificial intraocular lens capable of producing an excellent visual result. All the disadvantages of aphakia, except lack of accommodation, can be overcome by the use of an intraocular lens. The problems to be solved were threefold: (1) to select a suitable transparent material that would not produce a tissue reaction; (2) to determine the size and refractive power of the lens; and (3) to devise a method of inserting and retaining the lens in position within the eye. A form of polymethyl methacrylate is best suited to the purpose, because its composition and optical properties are constant, and, being unpolymerized, there is no risk of gradual liberation of free polymeriser that might cause chemical irritation. The refractive index is 1.49 and the specific gravity 1.19. Since it cannot be boiled without risk of distortion and is affected by organic solvents, including alcohols, sterilization was done with 1% cetrimide. The intraocular lenticuli were made about 1 mm. less in diameter than the natural lens, for ease of insertion and to obviate pressure on the ciliary region and filtration angle, which might tend to produce cyclitis and glaucoma. The first lenses were made 8.35 mm. in diameter, with curvatures of the radii equal to those of the natural lens. But in the human eye it was found that such a lens was too strong. The present lens specifications are presented and the technique of the operation, which is more complex than simple extraction, is described. In the 25 eyes that have been subjected to this operation the results in the first 2 are unsatisfactory because the acrylic lenses were too strong, producing postoperative myopia. Binocularly, the visual result is a little worse, than with simple extraction. In the remaining 23 eyes serious difficulty has developed in only 1. Results in the other 22 cases are successful in that binocularly the visual result is better than it would have been with simple extraction alone.

Fluid Imbibition as Cause of Herniation of Nucleus Pulposus.—It is customary to suppose that protrusion of an intervertebral disk is the result of external mechanical factors acting on the spine. To make this explanation more acceptable, it has been suggested that the disk that herniates is not normal, and that a force that could not harm a normal disk might affect a "degenerating" disk. However, this explanation is not satisfactory, because the "degenerative" process seems to be mainly one of dehydration, and this is not the physical state that would predispose to protrusion. In this report Charnley presents clinical and experimental evidence that protrusion of a nucleus pulposus might result from intrinsic causes in the disk, and that in certain circumstances the nucleus may swell and extrude itself spontaneously. There are several features in the lumbago-sciatica syndrome that make it difficult to postulate an external mechani-

cal cause: 1. Though the acute lumbago syndrome can follow sudden severe strains in lifting heavy weights, oftener it starts without recognizable injury. 2. The lumbago-sciatica syndrome often follows exposure to wet and cold. 3. The pain of acute lumbago is quite unlike the pain that follows a severe injury to the spine. 4. Severe injuries of the spine rarely cause immediate sciatica. 5. A sudden, violent attack of sciatica is often preceded by a prodromal phase. The experimental evidence presented here was obtained after imbibition of isotonic or hypertonic sodium chloride solutions by intervertebral disks in the lumbar spine of fresh human cadavers. It has been generally accepted that the nucleus pulposus contains a substance of the nature of a mucopolypeptide with hydrophilic properties. It is now postulated that under certain conditions the disk may absorb an abnormal amount of fluid, producing an abnormally high internal pressure, and that this sudden tension inside the disk may result in acute lumbago. The conditions that could precipitate this episode of hypertension might be varied and, though unlikely, could even be infective as, for instance, after exposure to wet and cold. Once the pressure has risen inside the disk, a protrusion may start, and thereafter slight injury may complete the bursting of the annulus. An external protrusion impinging on a nerve root may then cause sciatica. If this hypothesis proves correct, prophylactic medical treatment of lumbago may become possible.

Minerva Pediatrica, Turin

3:571-614 (Nov. 1) 1951. **Partial Index**

*Clinical and Roentgenologic Contribution to Knowledge of Mediastinal Pleurisy in Children. P. Menghi and L. Parenzan.—p. 571.
Behavior of Antigens of Eberthella Bacillus Isolated from Patients Treated with Various Therapies. L. Bavastrelli.—p. 579.
*Cor Triloculare Biatrium: Angiocardiographic Confirmation. R. Bulgarelli.—p. 582.

Mediastinal Pleurisy in Children.—In the last 16 years mediastinal pleurisy was observed in 15 children from 45 days to 10 years old. In seven cases the disease was secondary to homolateral pulmonary tuberculosis and in seven to bronchopneumonia of unknown origin. In one case determination of the cause was difficult because rheumatic disease was associated with a tuberculous process. In three patients the mediastinal pleurisy was associated with diaphragmatic pleurisy and in two with interlobular pleurisy. In six the process involved the right posterosuperior area. Because the general condition of the patients remained good and physical manifestations (cough, dyspnea, and headaches) were rare, the roentgenologic examination was important in the diagnosis. The authors discuss the characteristic changes revealed on roentgenograms, which vary according to the area involved, and suggest the use of body section roentgenography and of oblique and lateral view roentgenograms. They also discuss the differentiation of mediastinal pleurisy and hypertrophic thymus, pericarditis, tracheobronchial adenopathy, aneurysm of the aorta, mediastinal abscess, chronic mediastinitis, esophageal diverticulitis, and megaesophagus. It is most important to determine whether the process is tuberculous, and this is easily done in children by testing their intradermal reaction to tuberculin. Treatment was the same as that for common pleurisy, and various drugs were given according to the etiology of each case. Local application of drugs and surgical treatment, which should be limited to severe cases, were avoided. Aspiration by puncture was performed only in one patient in whom signs of mediastinal compression were present. Sulfonamides and antibiotics were given to the children who were observed after these drugs became available. Recovery occurred in all the patients, the disease lasting from 1 to 4 months in those with nontuberculous mediastinal pleurisy, and from 2 to 12 months in those with tuberculous forms. The regression was evidenced in the roentgenograms by gradual reduction of the extension of the shadow, which had irregular and faded margins.

Cor Triloculare Biatrium.—This rare congenital anomaly is reported in a girl, 4½ years old, with a history of pronounced cyanosis at birth and frequent attacks of bronchitis, asphyxia, and dyspnea. Diagnosis of congenital heart disease was made when the patient was 4 months old. On admission she had marked cyanosis of the face, mucous membranes, and extremities, clubbed fingers, and edema of the legs. The pulse rate was 125 per minute, respiratory rate 28, and blood pressure 80/50 mm. Hg. Percussion revealed pronounced enlargement of the heart, and a slight murmur, which lacked the characteristic rasping quality of most congenital heart diseases, was heard over the precordium. An enlarged liver was felt. Blood examination revealed a hemoglobin level of 140%, 6,000,000 erythrocytes, and 8,000 leukocytes. Electrocardiograms, which revealed an abnormal P wave, especially in lead 2, and a prolonged PQ interval, were of little value for the diagnosis. Roentgenograms revealed an enlarged heart and absence of the shadow of the interventricular septum. Six angiocardiograms were taken, and these were decisive in the diagnosis. Soon after injection of the contrast medium, not only the area corresponding to the right ventricle was opaque but also the area corresponding to the left ventricle, indicating that there had been no obstacle to passage of the contrast medium from one area to the other. A normal-sized pulmonary artery was also opaque, while a small-sized aorta could not be seen well. A fourth angiocardiogram, taken four and one-half seconds after the first, revealed that the contrast medium, having traversed the pulmonary circulation and the left auricle, reappeared in the common ventricle and passed freely from the area corresponding to the left ventricle to that corresponding to the right ventricle. Diagnosis was made of cor triloculare biatrium, with transposition of the great vessels. This rare congenital heart anomaly is a malformation resulting from an extremely early arrest in the development of the heart. There is only one ventricle, since the interventricular septum is missing, but there is generally a rudimentary cavity that results from the persistence of the bulbus cordis. There are three types of cor triloculare biatrium. In the first type the normal-sized aorta springs from the common ventricle and a small pulmonary artery originates from the rudimentary chamber. In the second type, with the arrested development of the ventricle there is also transposition of the great vessels, a small-sized aorta arising from the rudimentary chamber, and a normal-sized pulmonary artery from the common ventricle. In the third type, both vessels arise from the rudimentary chamber and are of approximately the same reduced size. Clinical and radiological findings, angiocardiograms, and differential diagnosis of the three varieties of cor triloculare biatrium are discussed.

Nederlandsch Tijdschrift v. Geneeskunde, Amsterdam

95:3717-3812 (Dec. 15) 1951. **Partial Index**

Case of Herpes Zoster Encephalitis. W. Briët and H. R. van der Molen.—p. 3732.
Treatment of Perforated Gastric and Duodenal Ulcers at a Clinic in Groningen from 1938 to 1950. H. J. Oterdoom and W. H. A. Quast.—p. 3737.
Reliability of Combined Pregnancy Tests According to Galli Mainini and Konsuloff. J. C. A. Mighorst.—p. 3755.
*Familial Occurrence of Ankylosing Spondylitis (Bechterew's Disease). J. J. de Blécourt.—p. 3763.
*Macrocytic Anemia Refractory to Liver Therapy. A. A. Scherpenhuysen.—p. 3766.
Active Constituents of the Serum in Thymol Turbidity Reaction. H. Dekema.—p. 3774.

Familial Occurrence of Ankylosing Spondylitis.—The 296 patients with ankylosing spondylitis (Bechterew's disease) reviewed by de Blécourt belonged to 239 families; 96 cases occurred in 39 families and the remaining 200 cases were the only ones in a family. In two families there were four cases, and in one family five cases. Another interesting observation in this group was that 70 of 296 patients, or nearly one-fourth, were women. This percentage is considerably higher than the average of 10% usually given in the literature. In view of the rather high familial occurrence, the author suggests that by examining the members of the families of patients with ankylosing spondylitis, it might be possible to detect some cases quite early.

Macrocytic Anemia Refractory to Liver Therapy.—Disturbances in the digestion of fat were observed in two patients who had had anemia for a number of years. At the same time the anemia became hyperchromic and the bone marrow showed a megalocytic character. In one patient the disorder developed

during pregnancy. Both patients had normal gastric acidity. Improvement resulted from treatment with folic acid, but not from treatment with liver preparations or vitamin B_{12}. One of the patients developed a severe allergic reaction to folic acid, and both patients had abnormal pigmentations. The author cites reports from the literature in which brownish skin pigmentation was observed in anemia that was refractory to liver therapy. Postmortem examination disclosed in some of these cases other signs of hemachromatosis, but the blood sugar curve was normal.

Nordisk Medicin, Stockholm

46:1847-1866 (Dec. 12) 1951. **Partial Index**

Advisability of Routine Blood Transfusions in Operations (Based on Review of 345 Stomach Operations). O. Noring and K.-E. Sjölin. —p. 1851.
*Late Juvenile Diabetes. L. Recht.—p. 1855.
Persisting Bacteriuria in Children: Follow-Up. T. Ive.—p. 1858.

Late Juvenile Diabetes.—Follow-up examination of 31 patients with juvenile diabetes observed for at least 10 years revealed that six were dead. The average age at the onset of diabetes was 12.7, and the average age at death was 27.3. Of the two who died from uremia one had Kimmelstiel-Wilson's syndrome, and in this case intracapillary glomerulosclerosis was confirmed at necropsy. Three died from pulmonary tuberculosis, and one died in diabetic coma. Of the surviving 25 patients, 24, with average age of 27.4 and average duration of diabetes of 15½ years, were examined objectively: in 12 Recht found albuminuria; in 8, edema; in 8, urea clearance of less than 45 cc. per minute; in 6, hypertension; in 16, retinal hemorrhages; in 4, blood cholesterol levels of more than 300 mg. per 100 cc.; and in 6, hemoglobin values of less than 75%. Four patients were free from symptoms. A correlation was established betwen kidney and eye symptoms. No relation was demonstrable between the incidence of complications and control of the diabetes or type of diet.

Pediatria, Naples

59:621-786 (Sept.-Oct.) 1951. **Partial Index**

*Juvenile Progressive Paralysis: Description of Five Cases. R. Ruggeri. —p. 621.
Presence of Leukocytolysins in Blood During Serum and Histamine Shock. F. Recchia, L. Ravazzoni, and M. Ghiron.—p. 634.
Intestinal Intussusception in Infants: Analysis of 55 Cases. W. Galluzzi and A. Gianelli.—p. 644.

Juvenile Progressive Paralysis.—Juvenile progressive paralysis is reported in five children, 7, 9, 10, 11, and 12 years old, respectively, with a history of normal development prior to onset of the disease. As progressive deterioration of the psychic faculties and changes in behavior characterized by lack of initiative and abulia occurred, some patients who had been good students up to the fifth grade could not even recognize the letters of the alphabet. None of these phenomena was considered for an early diagnosis, and the patients were seen only years later. On examination, signs of congenital syphilis were hard to detect in some patients, and tuberculosis and alcoholism were not found in the parents. Anisocoria with little or no reaction to light and accommodation was present in all patients; two had pronounced tremor, one dysarthria, two spastic paraparesis, and one, who subsequently became unable to speak, had severe epileptic attacks. Malariotherapy, pyretotherapy, arsphenamine, and bismuth gave good results in the first patient who, 15 years after the onset of the disease, is an efficient mechanic despite a slight mental defect. Treatments were not effective in the other patients, the third of whom died from marasmus after three years. The effects of penicillin administered intrathecally and subcutaneously could not be evaluated in the fourth patient. The fifth patient is still hospitalized. The author attributes these poor results to the fact that the correct diagnosis was made too late, and suggests that, whenever mental deterioration is observed in children, diagnosis of juvenile progressive paralysis be made and cerebrospinal fluid be examined. Early diagnosis and treatment with malariotherapy, antisyphilitic drugs and penicillin may ameliorate the prognosis that to the present has been unfavorable.

Philippine Medical Association Journal, Manila

27:639-732 (Nov.) 1951

Studies on the Lepromin Reaction: Preliminary Report. H. W. Wade. —p. 639.
Dietary and Nutritional Approach to Some Medical and Public Health Problems in the Philippines. A. C. Regala, C. R. Pascual, L. C. Santiago and A. P. Bautista.—p. 645.
Statistical Study of 177 Cases of Hydatidiform Mole Admitted to Philippine General Hospital from April 6, 1945, to December 31, 1950. H. A. Sison and H. B. Panlilio.—p. 652.

Prensa Médica Argentina, Buenos Aires

38:2833-2906 (Nov. 2) 1951. **Partial Index**

Indications for Lobectomy in Treatment of Bronchogenic Carcinoma. H. D. Aguilar and R. F. Brignone.—p. 2833.
Antihistamines and Pregnancy. S. Castro and E. Koremblit.—p. 2837.
Treatment of Hypertensive Vascular Disease with Kempner Diet and Low Sodium Diets. F. Motoreano and H. Rabenko.—p. 2849.
*"Trial" Chemical Lobotomy: Procaine (Novocaine®) Hydrochloride Prefrontal Block: Preliminary Report. E. E. Krapf and J. H. Lyonnet. —p. 2866.
Treatment of Massive Gastroduodenal Hemorrhages. A. R. Albanese. —p. 2875.

"Trial" Chemical Lobotomy: Prefrontal Block with Procaine Hydrochloride.—Uncertainty of the outcome of prefrontal lobotomy, which sometimes produces undesirable personality changes not compensated for by improvements in conduct, led the authors to consider the possibility of carrying out a "trial" lobotomy. Three patients with severe psychiatric symptoms were selected for the experiment, and procaine (novocaine®) hydrochloride, which had proved harmless when injected into the brain, was used in the procedure. Two simple trepanations were made with the patient under local anesthesia, without premedication, at the classic sites for lobotomy according to Freeman and Watts. The ventricles were located, and 4 cc. of 2% procaine hydrochloride was injected very slowly in the plane of the coronal suture, on each side in each of four locations from above downwards. Infiltration was followed by improvement, which continued for several days and then gradually declined. The favorable results obtained from the procaine block indicated that lobotomy would be successful, and it was carried out. The symptoms of all three patients were relieved and two were discharged to their homes. Further studies are being carried out, and it may be that a series of prefrontal procaine injections will bring about a cure without the necessity of operation.

Presse Médicale, Paris

60:1-20 (Jan. 5) 1952. **Partial Index**

*Suprahyoid Distention on Inspiration in Poliomyelitis. P. Sédallian, F. Jourdan, A. Bertoye and others.—p. 1.
*Intravenous Administration of *p*-Aminosalicylic Acid in Pulmonary Tuberculosis. J. Paraf, P. Zivy, J. Bory and others.—p. 3.

Suprahyoid Distention on Inspiration in Poliomyelitis.—A distention of the suprahyoid region with each inspiration, resembling in extreme cases the submaxillary movements accompanying the breathing of the frog, has been observed in patients with poliomyelitis and severe myelitis. This symptom may appear before any other sign of bulbar involvement, independently of the classic signs of such involvement, and at a time in the course of respiratory paralyses of the spinal type when everything seems to warrant the belief that use of an artificial respirator will relieve the patient. Investigation of the mechanism of this distention shows that activity of the suprahyoid muscles is normally inhibited by the reflex route. Appearance of suprahyoid distention is caused by simultaneous involvement of both inhibitive centripetal pathways, either by numerous peripheral injuries, or by bilateral injury to the pneumogastric nerves between the point of their emergence from the medulla oblongata and the point where the superior laryngeal nerves originate, or by a functional lesion of the intramedullary nucleus upon which the centripetal pneumogastric nerves converge. Suprahyoid distention thus results from bilateral interruption of the centripetal vagal fibers and can only be explained by a bulbar lesion.

p-Aminosalicylic Acid Given Intravenously in Pulmonary Tuberculosis.—The development of a new, stabilized, apyrogenic solution containing 15 gm. of *p*-aminosalicylic acid per 500 cc. has made it possible to give daily infusions for from 30 to 60 days. The results obtained by this method indicate that *p*-aminosalicylic acid is the most efficacious medication now available for use in pulmonary tuberculosis. The first infusions should be given slowly (40 drops a minute during the first quarter hour, rising to 100 to 120 drops a minute if no unfavorable reaction occurs); later ones may be timed so that the 500 cc. are given in an hour and a half. Digestive disturbances that often accompany oral administration of *p*-aminosalicylic acid are rarely observed; colic sometimes occurs, but is easily controlled by belladonna. Contraindications are chiefly nephritis (except renal tuberculosis), diabetes, cardiac decompensation, and phlebitis. Infusions during pregnancy are well tolerated and have proved highly useful. *p*-Aminosalicylic acid is effective when given by intravenous infusion because the high blood concentrations enable the drug to enter the bronchi or cavitary spaces and act directly on the lesions. It liquefies caseous material, facilitating its evacuation and the revascularization of the wall of the cavity. This twofold action, helped by bacteriostasis, makes regrowth of tissue possible. These effects and its action on bronchial lesions explain the favorable results of intravenous *p*-aminosalicylic acid therapy in cases with cavitation. Two or three weeks of infusions are often needed for improvement or closure of cavities; noncavitary lesions and recent or nodular foci yield more rapidly to treatment. Results may be judged in from 15 to 30 days; after this period, progress is usually limited. The shortness of this time is advantageous; decision in regard to collapse therapy, which is usually indicated, is not unduly delayed and development of *p*-aminosalicylic acid resistance is prevented. Results obtained by this method in from 80 to 90% of cases are excellent; in 30% of cases of recent pulmonary tuberculosis with cavitation complete cure is obtained (supportive treatment and prolonged rest are needed for consolidation); and in 60% improvement occurs but collapse therapy is required to bring about perfect healing. Streptomycin may be combined with intravenous *p*-aminosalicylic acid, if needed; indications for its use are severe attacks of pneumonia and bronchopneumonia, as well as miliary tuberculosis and tuberculous meningitis, in which the synergistic action of the two products is especially valuable.

Quarterly Journal of Medicine, Oxford

20:313-448 (Oct.) 1951

Artificial Pneumothorax: Survey of Personal Series. F. Scadding, H. Nicholson and C. Hoyle.—p. 313.
Heredity of Hypertension in Diabetes Mellitus. H. W. Balme and L. Cole.—p. 335.
Use of Radioactive Iodine in Assessment of Thyroid Function. J. F. Goodwin, A. G. Macgregor, H. Miller and E. J. Wayne.—p. 353.
Influence of Intravenous Digoxin on Renal Function in Congestive Cardiac Failure. P. H. Davison and R. Gaddie.—p. 389.
Infective Hepatitis and Cirrhosis of Liver. P. B. Fernando and R. S. Thanabalasunderam.—p. 403.
Observations on Symptomatology and Pathogenesis of Hepatic Coma. J. M. Walshe.—p. 421.

Revista Española de Tuberculosis, Madrid

20:599-658 (Oct.) 1951

*Treatment of Pulmonary Tuberculosis with Pneumothorax and Intrapleural Injections of Streptomycin. J. Abelló.—p. 599.
Treatment of Giant Cavities of Upper Lobe. L. Sagaz.—p. 643.

Pneumothorax and Intrapleural Injection of Streptomycin in Tuberculosis.—Streptomycin and other antibiotics administered intrapleurally to patients subjected to pneumothorax do not irritate the pleura and are absorbed completely. Intramuscular administration of the antibiotics should continue, being interrupted only on the days when the intrapleural injection is given in order to avoid excessive dosage. Intrapleural administration of antibiotics combined with collapse therapy causes rapid disappearance and cicatrization of the lesions on both sides and shortens the treatment period. A mixture of procaine and potassium penicillin and dihydrostreptomycin ("syncrobin") has proved effective against many bacteria, producing a high concentration in the tissues through the action of the soluble potassium salt of penicillin and maintaining it by the less soluble penicillin procaine G, while the dihydrostreptomycin combats the organisms resistant to penicillin. Streptomycin and the penicillin-dihydrostreptomycin mixture are especially valuable in treating empyema; after intrapleural injection of these medications, the pleural effusion rapidly becomes clear and sterile. Intrapleural injection is indicated when prompt application of the antibiotic to the lesion is needed, as in exudative lesions, cavities with extensive inflammation, and serious bilateral lesions. The injections, which should be given slowly with fine needles in order not to injure the parietal pleura, may begin with the third puncture for pneumothorax. The pleura should not be irritated by prolonged treatment; when optimum collapse has been secured and tomography shows the lesions to be undergoing cicatrization, intrapleural injections should be discontinued. Intramuscular administration of the antibiotics should be maintained, and the surgical or other treatment indicated by the patient's condition should not be abandoned or varied.

Rev. Fac. Cienc. Med. Univ. Nac., Córdoba

9:441-722 (July-Dec.) 1951. **Partial Index**

*Papilliferous Adenomas of Breast. J. González Warcalde and L. V. Ferraris.—p. 441.
*Cancer of Endometrium Before Menopause. M. Alberto Freire.—p. 453.
Arterial Circulation of Tympanic Membrane. G. O. Suárez.—p. 467.
Thrombophlebitis of Right Upper Petrous Sinus and Paralysis of Third Cranial Nerve. O. Luque and R. Pucheta Morcillo.—p. 477.
Difference Between Vitamin and Hormone. J. Eliseo Pagano.—p. 525.
Uremia Caused by Low Ureteral Obstruction in Cancer of Neck of Uterus. J. M. Dionisi.—p. 533.

Papillary Adenomas of the Breast.—In a period of 30 years 17 cases of papillary adenomas of the breast were observed in the Instituto de Anatomia Patológica of the University of Córdoba. The majority of the patients were between the ages of 40 and 50 years. Seven patients complained of hemorrhage from the nipple that had lasted between 1 and 2 years. The tumor was of the glandular or pseudoglandular form in 13 cases. The histological study of the tumoral tissues showed zones of cylindrical and of transitional epithelial cells in three cases and evident carcinomatous transformation of the cells in two cases. The author concludes that papillary adenomas of the breast are potentially malignant and necessitate removal of the tumor with ample excision of the breast. A careful anatomicopathologic study of the cystic walls and of the peritumoral tissues is advisable.

Cancer of Endometrium Before Menopause.—In a period of nine years 102 cases of cancer of the endometrium were observed in the Instituto del Cancer of the University of Córdoba. Thirty-nine patients were young women. The disease is more frequent in single women and in women who use contraceptive measures than in women who have had children. It is also more frequent in patients with arterial hypertension or diabetes. Frequently endometrial cancer follows a theca cell tumor. It is never observed in castrated women. Endometrial cancer in young women has no characteristic symptoms. Usually there is no pain and intermenstrual metrorrhage may simulate disorders of menstruation. However, intermenstrual hemorrhages are frequent, the uterus is of increased size, and the cervix is slightly opened. Diagnosis depends on biopsy findings. Young patients with endometrial cancer are in a general condition of hyperestrinism, which is the main cause of acute recurrent hemorrhages in cases of single or multiple myoma or of recurrent polyposis.

Semaine des Hôpitaux de Paris

28:123-164 (Jan. 14) 1952. **Partial Index**

*Hyperostosis Frontalis Interna in Man; Syndrome of Internal Frontal Hyperostosis and Testicular Atrophy. J. Warter and R. Moïse.—p. 123.
Effect of Infiltration of Vagus Nerve on Biliary Colic. J. Warter, J. M. Rouillard and J. Morin.—p. 127.
Nucleic Acids of Leukocytes. P. Mandel and P. Métais.—p. 129.

Hyperostosis Frontalis Interna in Man.—The occurrence of hyperostosis frontalis interna is reported in a 39-year-old man with asthenia and atrophic myotonia. Tendon and periosteal reflexes were abolished. For years the patient had persistent frontal

headache nearly every day. His basal metabolic rate was -19%, and he had bilateral testicular atrophy. Roentgenologic examination of the skull revealed hyperostosis frontalis interna. Determinations of 17-ketosteroids in the urine revealed a considerable decrease in urinary androgens. The phenol steroids eliminated in the urine were near normal, but the patient had been treated for a prolonged period with testosterone propionate. Two injections of 50 mg. of this drug were given every week and 5 mg. of methyl testosterone was given orally daily for 10 months. The muscular condition improved considerably, but the hyperostosis frontalis interna was unchanged. The right patellar reflex was restored to normal after 6 months of treatment and remained normal after 10 months of treatment. The authors believe that testicular atrophy with the subsequent alteration of the androgen/estrogen ratio is responsible for the calvarial hyperostosis. It seems necessary therefore to study the roentgenographic appearance of the skull in all cases of male hypogenitalism. With regard to the favorable effect of the testosterone therapy on the patient's muscles, the authors recall the influence of androgens on the striated muscles, and they speculate that hyperostosis frontalis interna may occur in all primary diseases of the muscular system. Roentgenographic examination of the skull, therefore, is advisable in all such cases, particularly in Steinert's disease.

Tubercle, London

33:1-32 (Jan.) 1952

Rehabilitation and Resettlement. J. E. Geddes.—p. 2.
Clothing Shadows in Mass Radiography. R. Stalker.—p. 9.
Effects of Pregnancy on Pulmonary Tuberculosis. G. Beven.—p. 13.
Radiography and Tuberculosis: Selective and Mass Methods. H. J. Trenchard and R. Grenville-Mathers.—p. 20.
Sarcoidosis of Spleen and Bone-Marrow. A. Piney and M. S. Ross.—p. 24.

Zeitschrift für Immunitätsforschung, Jena

109:97-192 (Jan. 3) 1952. **Partial Index**

Specificity and Mode of Action of Bacteriophages. H. Billaudele.—p. 103.
Action of Splanchnic Stimulation on Bactericidal Effect of Serum. L. Goreczky, G. Ludány, J. Tóth and J. Vajda.—p. 118.
Behavior of Complete and Incomplete Agglutinins in Course of Immunization of Rabbits with Human Serum. K. Hummel.—p. 124.
*Significance of Rhesus Subgroups in Transfusion Reactions. H. J. Pettenkofer.—p. 144.
Studies on European Q-Fever Antigens. K. Herzberg and H. Urbach.—p. 159.

Rh Subgroups as Cause of Transfusion Complications.—In the typing of blood transfusion donors and recipients only the classical ABO system with subgroups and the Rh factor are considered, and the Rh subgroups are disregarded. It is assumed that only factor D (Rh_o) has antigenic characteristics so pronounced that disregarding it would lead to complications. Moreover the test serums that would be necessary for the determination of the Rh subgroups are not available. Pettenkofer cites an example that demonstrates the importance of Rh subgroups as cause of transfusion reactions. He demands that blood transfusion centers examine at least all Rh-negative donors for their Rh subgroups. Rh negative donors with the subgroup Cde, cdE, and CdE should not be accepted as donors.

Zeitschrift für Krebsforschung, Munich

57:577-684 (No. 6) 1951. **Partial Index**

Histologic and Cytologic Investigations on Fibroepitheliomas of Urinary Bladder. K. Kloos and J. Steffen.—p. 577.
*Use of Nitrogen Mustard in Recurrent Cervical and Mammary Carcinomas and in Metastatic Tumors of Bones and Lungs. F. Remold and A. Siegert.—p. 614.
Action of Folic Acid Antagonists and of Guanazola on Behavior of Tumors. C. Dittmar.—p. 621.
Action of Teropterin and Aminopterin on Human Bone Marrow in Vitro. I. Boll and H. Schlag.—p. 643.
Porphyrins and Cancer: Porphyrin Content of Malignant Tumors in Human Subjects. K. Bingold, W. Stich and H. Cramer.—p. 653.
Relations Between Lymphogranulomatosis and Reticulum Cell Sarcoma: Studies on Tissue Cultures. K. Werner, C. Landschütz and G.-A. Kausche.—p. 672.

Nitrogen Mustard in Recurrent and Metastatic Tumors.—The aim of these studies was to ascertain the mode of action and the therapeutic effect of nitrogen mustard in the treatment of recurrent cervical or mammary carcinomas and of metastatic bone and pulmonary tumors. The following factors served as criteria: the patient's subjective feeling; the objective status as determined by palpation, auscultation and roentgen examination; the general condition, as manifested by body weight and blood picture and finally the further course of the disease. Particular attention was given to the blood picture during and after treatment. The authors used the "tris" nitrogen mustard and, after commenting on the different dosage schemes that have been used, they say that they used Heilmeyer's method, in which 0.05 mg. per kilogram of body weight is administered every second day. A total of 38 patients were treated. Secondary effects in the form of malaise, nausea, loss of appetite, and vomiting as a rule were noted only after the third or fifth injection. It was found that the treatment with nitrogen mustard produced neither subjective nor objective improvement, but rather a definite and largely irreversible deterioration of the hematopoietic function and impairment of the patient's general condition with accelerated decline. The authors feel that treatment with the nitrogen mustards is inadvisable and unjustified.

Zeitschrift für Orthopädie, Stuttgart

81:209-376 (No. 2) 1951. **Partial Index**

Experiences in Operations on the Knee Joint, Particularly in Internal Injuries of the Knee. K. Niederecker.—p. 225.
*Tuberculous Humpback. W. Schosserer.—p. 250.
The Varicose Syndrome. H. Storck.—p. 259.
Technique of Operation for Syndactylism. W. Pacher.—p. 269.
*Operative Treatment of Perthes' Disease by Means of Drilling and Bolting. A. Stupnicki.—p. 272.
Modern Anesthetic Methods and Treatment of Shock in the Course of Orthopedic Operations. G. Glogowski.—p. 281.
Intrapelvic Protrusions of the Floor of the Acetabulum in Adults, with Particular Consideration of Arthrokatadysis. G. Imhäuser.—p. 311.

Tuberculous Kyphosis.—According to Schosserer, tuberculous processes in the vertebral column are usually accompanied by hump (gibbus) formation. This is due to the fact that in tuberculosis of the vertebral bodies, the anterior portions are usually more severely destroyed and collapse. The hump becomes greater as more vertebrae become involved in the destructive process. Furthermore, after the tuberculous process becomes arrested, resorption sets in, which removes the dead tissue, and may enlarge a gibbus that in the beginning was hardly preceptible. In cases in which destruction is uniform throughout the body of the vertebra, collapse takes place in the axial direction. These cases are usually comparatively benign and blocking usually follows soon. After briefly commenting on the prevention and treatment of gibbosity, the author says that observations on a large number of patients with spondylitis and gibbus formation reveal that there are three different forms, depending on whether the cervical, upper thoracic, or lower thoracic portion of the vertebral column is involved in the tuberculous process. Sketches clarify these forms, and it is pointed out that in patients with cervical spondylitis the skull generally is lengthened in the direction of the line drawn from the apex of the lambdoid suture to the chin. This is illustrated by profile photographs. It is also suggested that there is a relationship between the location of the gibbus and the temperamental characteristics of the patients in that gibbus in the cervical region is usually found in patients of the schizothymic type and asthenic build, who are intelligent, ambitious, and tend to be extreme in their attitudes. A cycloid temperament and a pyknic build are usually observed in those whose gibbus is located lower down.

Drilling and Bolting in Treatment of Perthes' Disease.—After a short discussion of the nature and the conservative treatment of Perthes' disease, Stupnicki presents five cases in which drilling and bolting of the head and neck of the femur were employed. This method produced favorable results in all five cases, and the author agrees with Schäffer and Zanoli that this method requires a much shorter time than conservative treatment. However, the operation does not always prevent the mushroom-like spreading of the head and neck of the femur.

BOOK REVIEWS

Antibiotic Therapy. By Henry Welch, Ph.D., Director, Division of Antibiotics, Food and Drug Administration, Federal Security Agency of United States Government, and Charles N. Lewis, M.D., Medical Officer, Division of Antibiotics, Food and Drug Administration. Foreword by Chester S. Keefer, M.D., Wade Professor of Medicine, Boston University School of Medicine, Boston. Cloth. $10. Pp. 562, with illustrations. Arundel Press, Inc., P. O. Box 2606, Washington 13, D. C., 1951.

This book is designed to provide the busy practitioner with a ready reference to antibiotic therapy. The first chapter is devoted to a broad historic survey, and the next eight chapters are devoted to discussion of antimicrobial activity, pharmacology, and dosage forms of the most widely used antibiotics. In the concluding 11 chapters, the use of antibiotics, in specific diseases, is discussed. Each chapter contains a selected series of references. Throughout the text, there are portraits of a number of pioneers in the field of antibiotic research and development and many full-page graphs. For the most part, these graphs are helpful additions to the text, but, in some instances, they are not as clear as they might be, because of incomplete or inaccurate labeling or inadequate coverage in the text. This is particularly true of the charts showing the relative sensitivity of microorganisms to various antibiotics and the nomograms relating dosage to body weight. Although no book can be completely up-to-date in this rapidly developing field, this volume contains a wealth of practical clinical information that is discussed in a clear, concise manner.

Man and His Years: An Account of the First National Conference on Aging. Sponsored by Federal Security Agency. Cloth. Pp. 311. Health Publications Institute, Inc., 216 N. Dawson St., Raleigh, N. C., 1951.

This book, divided into 13 chapters, reviews the various subjects discussed at the First National Conference on Aging and the conclusions reached and the recommendations made by each group of the Conference. The 14th chapter, entitled "Next Steps," outlines the proposed implementation of the recommendations resulting from the conference. The book covers the aging population, population changes and economic implications, income maintenance, employment, employability, and rehabilitation, health maintenance and rehabilitation, education, family life, living arrangements and housing, creative and recreational activities, religious programs and services, professional personnel, research on aging, and community organization. It will probably have only a limited place as a reference work for social and welfare workers; but other than this, it is useful for no other purpose. One does not get absorbed in the book; it is somewhat difficult to read, and most, if not all the subjects, have been previously discussed, debated, and written about.

The Effect of Hormones upon the Testis and Accessory Sex Organs. By Norris J. Heckel, A.B., M.D., Clinical Professor of Urology, Department of Surgery, University of Illinois College of Medicine, Chicago. Publication number 110, American Lecture Series, monograph in American Lectures in Endocrinology. Edited by Willard O. Thompson, Clinical Professor of Medicine, University of Illinois College of Medicine, Chicago. Cloth. $2.25. Pp. 73, with 21 illustrations. Charles C Thomas, Publisher, 301-327 E. Lawrence Ave., Springfield, Ill.; Blackwell Scientific Publications, Ltd., 49 Broad St., Oxford, England; Ryerson Press, 299 Queen St., W., Toronto, 2B, 1951.

This small volume contains an excellent review of the subject. It is well written and concise and should answer many of the questions that have arisen from recent experimental work on the male hormone and its actions on the sexual organs. From the practicing physician's standpoint, however, it suffers in its briefness, since there is a scarcity of clinical details and information regarding tests and diagnostic procedures. Because of the excellence, however, of the discussion on the basic physiological relationships of the male hormone to accessory sex organs, this may not be too serious an objection, since the reader can then consult the bibliography for more abundant and detailed information.

The reviews here published have been prepared by competent authorities and do not represent the opinions of any official bodies unless specifically stated.

Cancer of the Esophagus and the Stomach. By Owen H. Wangensteen, M.D., Professor of Surgery, and Head, Department of Surgery, University of Minnesota Medical School, Minneapolis. Monograph for physician. Sixth of series on early recognition of cancer. Paper. Pp. 112, with 58 illustrations. American Cancer Society, Inc., 47 Beaver St., New York 4, 1951.

This monograph is a condensation of current knowledge of cancer of the esophagus and stomach. The personnel of the University of Minnesota library and members of the staff of the American Cancer Society contributed to its preparation.

From the literature concerning cancer of the upper portion of the digestive tract, the significant highlights have been extracted and arranged in logical sequence. Comment on the silent interval in cancer is followed by a consideration of cancer of the esophagus. The various possible lesions that confuse the picture are discussed in a chapter on diagnosis. Finally, illustrative case histories are given. This is followed by a discussion of the various surgical procedures that advancing science of surgery has evolved. Cancer of the stomach is discussed in the same manner. Consideration is given to pathology and precursors of gastric cancer. Under diagnosis, roentgenographic examination is recommended as the most reliable method available in the detection of early lesions. No mention is made of cytological studies of gastric washings as a possible aid in early diagnosis.

The monograph is generously sprinkled with illustrations in black and white and also color plates; charts, diagrams, and tables are effectively utilized. This monograph is an important contribution. In readable and concise fashion, it outlines the facts that have been proved in the search for a clearer identification of cancer of the esophagus and stomach. The spirit of the work is hopeful. It is recommended to practicing physicians as well as specialists. Only by intensifying the search for the early lesion and prompt resort to adequate therapy can the destructive malignant growths in the upper portion of the digestive tract be eliminated.

Perspectives in Human Malnutrition: A Contribution to the Biology of Disease from a Clinical and Pathological Study of Chronic Malnutrition and Pellagra in the African. By Joseph Gillman, D.Sc., M.B., B.Ch., and Theodore Gillman, M.Sc., M.B., B.Ch. Cloth. $18. Pp. 584, with 259 illustrations. Grune & Stratton, Inc., 381 Fourth Ave., New York 16, 1951.

This book has been written with three objects in view. The first object is to focus attention on the changing patterns of the clinical and pathological manifestations of chronic malnutrition and of pellagra in the native Johannesburg African, at various periods of his life. The second object is to assess the clinical and pathological findings at different stages of the syndrome in terms of modifications in physiological regulations. The third object is to examine the possibility entertained by us that chronic malnutrition, apart from being casually related to specific nutritional syndromes, affects the life tract of persons in such a way as to facilitate the emergence of some diseases, not usually regarded as etiologically related to nutrition, while excluding others. In their studies, a sharp distinction is made between chronic malnutrition and the acute episodes observed in chronically malnourished persons. Their experience has repeatedly demonstrated that some adults and many infants, admitted to a hospital, suffering from an acute episode of malnutrition, remained unresponsive and frequently died when treated by methods recommended for combating chronic malnutrition.

The perspectives in malnutrition suggest the necessity of shifting of emphasis in the study of disease from organs and tissues to physiological regulations and developmental processes. The effects of malnutrition can not be expected to always show themselves in the same way at all stages along the life track of a highly dynamic, rapidly evolving biologic system. Viewed in these perspectives, many diseases not hitherto regarded as etiologically related to nutrition or the environment become manifestations of a perverted development resulting from the peculiar metabolic momenta induced by the diet and by the physical and social environments.

As an example, the authors suggest that impairment of growth can not be regarded as arising from a primary lack of growth promoting hormones, but the secretion of growth promoting hormones is suppressed when the diet is qualitatively defective or quantitatively inadequate. The authors have provided evidence that suggests that, among a population malnourished for one or two generations, the adults already harbor such extensive lesions in many organs that chances for cure are, at present, remote; however, a substantial improvement in the diet of young women and pregnant mothers will probably minimize the effects of an adverse maternal metabolism on their offspring.

The science of nutrition is still in its infancy. Science has still not disclosed the diet most suitable for protecting man against cardiovascular degeneration, carcinoma, and other diseases. Man is still ignorant about the principles of nutrition. Unless this ignorance is accepted and recognized with frankness and humility, it will merely be a case of the blind leading the lame, as far as feeding a malnourished nation is concerned.

Good food is essential for the well-being and happiness of mankind. There is scarcely any other known stimulus capable of provoking, silently and insidiously, so much chronic ill health as a monotonous and inferior diet. There is scarcely any other way whereby it is possible, wittingly or unwittingly, to inflict, at once, such widespread bodily harm on so many persons as tampering incorrectly with the diet of a nation.

As part of a contribution to the wide problem of malnutrition, Gillman and Gillman have set forth, in book form, their experiences with malnutrition in the Johannesburg native African. This should be provocative reading to anyone interested in the field of nutrition.

Surgical Practice of the Lahey Clinic. By Members of Staff of Lahey Clinic, Boston. Cloth. $15. Pp. 1014, with 784 illustrations. W. B. Saunders Company, 218 W. Washington Sq., Philadelphia 5; 7 Grape St., Shaftesbury Ave., London, W.C.2, 1951.

The book contains much information and can be recommended to anyone interested in surgery. It contains frank and authoritative discussions on many accepted and moot procedures. The contents discussed are: thyroid gland and neck; esophagus, lungs, and heart; stomach and duodenum; small intestine, colon, sigmoid, and rectum; biliary tract; spleen, adrenal gland, and pancreas; breast; pelvis; bones and joints; brain, spinal cord, and nerves; and anesthesia.

In the section dealing with subtotal thyroidectomy, there is the description of the operation originally described by Lahey, which has given him excellent results. Figure 16 on page 29 reveals platysma muscle being present in the midline. Since the platysma is deficient in this position, it would have been well to have shown this structure laterally rather than directly in the center. The section pertaining to tracheotomy after thyroidectomy is timely and well done. On the last line of page 132, dealing with tumors of the neck, the author refers to thyroglossal cysts when he means to say branchial cysts.

A total of 330 esophageal diverticula were operated on, with a mortality rate of 0.6% (two fatalities). All of these operations were done in two stages. The enthusiasm for this procedure can be gathered from the author's statement "we will continue indefinitely to employ the two stage rather than the one stage procedure." Total gastrectomy is being done in an increasing number of patients with cancer of the stomach, particularly those patients with cases in the earlier stages. A warning is sounded, however, that marked discrimination be used in the selection of patients for total gastrectomy. It is interesting to note the following statement: "In our hands, the percentage of two stage operations for carcinoma of the colon has steadily decreased in recent years." An increased number of patients with malignant disease of the large bowel were submitted to resection and primary anastomosis.

The section on the spleen is well written and informative. Figure 294 on page 535, however, presents the anatomy of the splenic artery and vein in an inaccurate fashion. In the majority of persons, the splenic vein runs behind the pancreas and not at its upper border as herein depicted. Furthermore, the splenic artery is the only branch of the celiac axis that takes a serpiginous course closely hugging the upper border of the pancreas. In this illustration, it is shown passing far above the pancreas and assuming a straight and vertical path. It is felt that carcinoma of the ampulla may be cured by pancreatoduodenal resection, but carcinoma of the head of the pancreas cannot. Total pancreatectomy, therefore, is thought to be a more logical procedure for this latter condition. The sections on partial lung resection and intracranial aneurysms were particularly well written.

Kreislaufuntersuchungen am Menschen mit fortlaufend registrierenden Methoden. Von K. Matthes, o. Professor für innere Medizin, Erlangen. Cloth. 48 marks. Pp. 326, with 205 illustrations. Georg Thieme, Diemershaldenstrasse 47, (14a) Stuttgart O; agents for U. S. A., Grune & Stratton, Inc., 381 Fourth Ave., New York 16, 1951.

This long monograph, in essence, brings together much previously reported work by the author; it is amplified by unpublished data and a review of some of the pertinent literature. Dr. Matthes, who is professor of medicine at Erlangen, describes his photoelectric extravascular methods for continuous and simultaneous recording of blood pressure, pulse rate, plethysmography, and blood oxygen saturation, in addition to respiratory excursions, skin temperature, and venous pressure. These methods were used in a series of investigations dealing with human respiratory and cardiovascular physiology under various conditions. The chapters deal with arterial oxygen saturation, oxygen saturation and vascular reactions during artificial arterial occlusion, pulse volume, rhythmic changes of blood pressure and pulse frequency, vasomotor reflexes, hyperventilation and carbon dioxide breathing, hypoxia, circulatory reactions to various drugs, such as sympathomimetics, hypertensive and hypotensive substances, atropine, and digitalis preparations.

Although containing few unexpected or startling results, this book may be of interest to those doing work in cardiovascular and aviation physiology. It will hardly appeal to the medical practitioner, except, rarely, as a source reference. It is unfortunate, and certainly detracts from the value of the book, that the many important physiological data recently gathered by means of human cardiac and aortic catheterization are hardly considered. The author states in the foreword that foreign publications have been taken into account "wherever possible." Much of the relevant postwar literature has reached Germany and should have been given more adequate representation in a book published in 1951. The format is good, and there are many illustrations. Since so many individual experiments are described or quoted in great detail, summaries at the end of each section would have been helpful.

General Medical Care Programs in Local Health Departments: A Report to the Subcommittee on Medical Care, Committee on Administrative Practice, American Public Health Association. By Milton Terris, M.D. and Nathan A. Kramer. Paper. 50 cents. Pp. 129. American Public Health Association, 1790 Broadway, New York 19, 1951.

This is one of several studies prepared by the staff of the Subcommittee on Medical Care of the Committee on Administrative Practice of the American Public Health Association. For the purpose of this study, the authors have undertaken to describe the medical services provided by local health departments for welfare recipients and the medically indigent.

As a preliminary step, the subcommittee addressed a questionnaire to every full-time local health department in the United States. On the basis of this questionnaire and supplementary data from state health officers, a list of 62 local health departments administering general medical care programs was compiled. This list represents approximately 5% of all full-time health departments; the only geographic concentration of this health department function is in Maryland, where all 23 counties are a part of a state-wide program. The remaining 39 counties and cities are located in 20 states and the District of Columbia.

The description of each program is brief, but it can be compared with all other descriptions. Characteristics are tabulated according to the following factors: origin and development, eligible population, services and personnel, volume of services, costs, and administration.

Except for the Maryland counties, most of the medical service programs administered by local health departments are centered around health department clinics or hospital clinics, where physicians' services, laboratory services, and drugs are readily available. The majority of these 39 programs provide for home care only in emergencies, and the care is generally given by full or

part-time city and county physicians. On the other hand, all but two of the Maryland county programs are centered about the offices of private physicians with home and office care.

It is evident from a review of the descriptions that there is little uniformity among these general medical care programs administered by health departments. The authors believe, however, that "health officers in several localities have made real contributions toward improving the services provided" and "have demonstrated that effective medical care administration is not merely a matter of paying for service but requires careful attention to the proper organization of personnel, facilities and services as the key to achieving high standards."

They definitely lean toward the type of program centered about a teaching hospital or medical school, where, it is assumed, more emphasis will be placed on the quality of service and on the prevention of disease. As in much of the present day literature, the individual practitioner is given a back hand slap by emphasizing "medical care administration" and "team approach" as opposed to "patient-physician relationship." There is, however, little doubt that some of the experiments in coordinating therapeutic services with preventive medicine will have influence on future programs in this field and that they represent an improvement over the types of programs generally in operation today.

The subcommittee is convinced that administration of public medical care programs can be entrusted to local health departments and that a number of the experiments described in the report lend substantial support to this conviction. This, and semilar expressions by the subcommittee, are more important than the descriptions of the plans themselves. The functions of local health departments generally accepted in the past, vital statistics, sanitation, communicable disease control, laboratory services, maternal and child health, and health education, are being expanded to include a variety of other services, including therapeutic services. This study supports this expansion into a specific field and points the way to possible future developments. Its full implications are not obvious in the reading. Their recognition requires a look to the past and a guess as to the future.

Aphorisms of Dr. Charles Horace Mayo, 1865-1939, and Dr. William James Mayo, 1861-1939. Collected by Fredrick A. Willius, M.D. Cloth. $2.75. Pp. 109. Charles C Thomas, Publisher, 301-327 E. Lawrence Ave., Springfield, Ill.; Blackwell Scientific Publications, Ltd., 49 Broad St., Oxford, England; Ryerson Press, 299 Queen St., W., Toronto 2B, 1951.

This small book contains 215 quotations culled from the complete writings of two great American surgeons, Drs. Charles and William Mayo; it also includes the so-called lost oration, in which Dr. William Mayo expressed the ideals of him and his brother before a Committee of the Minnesota State Legislature, in 1917.

Mayo thinking on a variety of medical, sociologic, and economic topics is exemplified by the following quotation. "Carry out the two fundamental surgical requirements: see what you are doing and leave a dry field." "When you want support for public health measures you have to educate the people. When you start to educate the people you should begin with the women because they will fight for the health of their children." "More good would come to our country through tongue control than birth control." "It is a man's duty to provide moderately for his family, but anything beyond this may be a detriment to his descendents." "The keen clinician, as he grows in experience, becomes more and more valuable as age advances."

Pediatric Allergy. By Robert Chobot, M.D., Assistant Clinical Professor of Pediatrics, New York University-Bellevue Medical Center, New York. Cloth. $4.50. Pp. 284, with illustrations. McGraw-Hill Book Company, Inc., 330 W. 42d St., New York 18; Aldwych House, Aldwych, London, W.C.2, 1951.

This volume is an abbreviated text on general allergy. The title and the inference in the preface that the book is specially adapted to pediatric problems are not borne out by the contents. Although the conventional subjects of textbooks on allergy are discussed, the author takes an unconventional stand on the role of infection. He advocates frequent removal of tonsils and adenoids in treatment of asthma and infantile eczema. Although much of the material is sound and conservative, dogmatism and loose statements are fairly common. On page 80, for example, it is stated, "clinical experience has proved the method (leukopenic index) to be inadequate, and it is no longer used in diagnosis," but the fact remains that certain persons still use it. On page 117, the author states, ". . . one thing we can be sure of is that with specific therapy pollen asthma can be prevented. . . ." Such therapy is often effective for pollen asthma, but one cannot be sure of it. On page 170, the author, in classifying horse serum reactions, mentions the naturally occurring type as occurring "when an allergic patient who is born spontaneously sensitive to horse serum. . . ." This is stated as an accepted fact, whereas evidence and acceptance point to the opposite opinion. There are many typographic errors and incorrect statements. Pages selected at random may serve as examples: on page 1, there are five, and on page 45, there are two errors. This book may be useful to anyone who is interested in a brief general coverage of the field of allergy, along with some unusual approaches.

Textbook of Psychiatry. By Eugen Paul Bleuler. Authorized English edition by A. A. Brill. With biographical sketch by Jacob Shatzky, Ph.D., Psychiatric Research Librarian, New York State Psychiatric Institute, New York. [Second edition.] Cloth. $7.50. Pp. 635, with 51 illustrations. Dover Publications, Inc., 1780 Broadway, New York 19, 1951.

This book, translated from the fourth German edition, is primarily a textbook for students and general practitioners, covering the general field of psychiatry.

The book is written from the viewpoint of psychodynamic psychiatry, the author having been one of the first well-known psychiatrists to apply the teachings of Freud. This volume stresses the need for a thorough understanding of normal psychology and general psychopathology, in order to provide a comprehensive basis for an understanding of the separate psychiatric entities.

In his consideration of the individual mental disorders, the author tends to follow the descriptive Kraepelinian classification. This differs considerably from the classification of mental disease, recently developed by the American Psychiatric Association, which appears in the fourth edition of "Standard Nomenclature of Diseases and Operations." The latter classification places greater stress on the functional aspects of diagnoses in mental disease.

This book is valuable to the student as an introduction to the basic thought underlying modern psychodynamic psychiatry. Much that has developed in recent years, in this field, has not been included; nevertheless, the clarity of expression, particularly in the chapters on psychology and the discussions of the basic factors and patterns underlying mental disorders, are still pertinent. The book is well illustrated. It includes a selected bibliography of Bleuler's original writings and a short biography of the author.

Arthritis: What You Can Do About It. By Robert D. Potter. Cloth. $2.75. Pp. 239. Dodd, Mead & Company, Inc., 432 Fourth Ave., New York 16, 1951.

The author's purpose in writing this book is to "tell the story of arthritis, and the story behind the story"—to tell what was done in advancing knowledge concerning the rheumatic diseases and to explain what these developments mean to the victims of arthritis and rheumatism. The book is written for the layman, the victim or the potential victim of rheumatism. Among the author's objectives are: (1) to give the rheumatoid arthritic patient hope and encouragement, which is provided by the development of cortisone and corticotropin, (2) to teach the sufferer from rheumatism to know more about this group of diseases in order to be better able to manage his problem, and (3) to eliminate superstition and unwarranted use of worthless nostrums. The subject matter, which ordinarily holds little interest for the layman, is so cleverly treated that the reader is kept keenly interested.

This book is based on reports of advances in the field of arthritis and rheumatism, made at the seventh International Congress on Rheumatic Diseases, held in New York City, in June, 1949. Although not encompassing all aspects of the rheumatic disease, the wide scope of the book is shown by the various chapters, which deal with the following subjects: (1) types of arthritic patients and types of arthritis, (2) role of cortisone and corticotropin (ACTH) in arthritis, (3) control of rheumatic fever, (4) psychogenic factors in rheumatism, (5) effects of climate on rheumatic diseases, (6) nonarticular rheumatism, (7) value of

physical treatment, (8) orthopedic surgical procedures, and (9) problems of synthesis of cortisone.

The format is conventional, and the type is pleasing to read. The author's style is appealing to the layman; the scientific subject matter is discussed in simple language, without scientific terminology. The chapter titles are clever and interesting. The subjects are dealt with in an intimate fashion, for the author has thorough knowledge of the facts and many of the investigators. There are no illustrations and no bibliography (this is not a text), but the facts have been carefully checked for accuracy by leading physicians in the field of rheumatology. This book is clearly the most reliable, up-to-date source of information about rheumatic diseases for the layman. It is written in an interesting manner and should be recommended to all patients who have rheumatism. Physicians, too, will find this monograph interesting and informative.

Pratique obstétricale. Par B. Jamain. Préface du professeur agrégé Jean Ravina. Paper. Pp. 200. L'Expansion scientifique française, 23 rue du Cherche Midi, Paris, 6e, 1951.

This little book is very clearly written in simple French. It is short and concise. Its size precludes extensive discussions and the covering of controversial subjects.

In general, one can agree with the recommendations for the management of complicated obstetric cases presented by the author and with his clinical observation in various conditions. On the other hand, the reviewer cannot agree fully with all of the recommendations for management, such as when the author advises the Simpson method of manual removal of the placenta before delivery of the baby in placenta previa and also when he speaks of the necessity for doing a high or classical cesarean section instead of a low cervical cesarean in placenta previa. The blood pressure is not always elevated in eclampsia; some of the most serious cases may have a low blood pressure. In the treatment of hyperemesis gravidarum, the possible seriousness of the condition is clearly pointed out, but no recommendation is made for the care of those patients that do not respond to medical management. The importance of avitaminosis is not sufficiently stressed in the management, and no mention is made of the interrelationship between hyperthyroidism and pernicious vomiting and the benefit to be derived from iodine in a selected group of these cases. In his discussion of vaginal cesarean section, under indications, he fails to mention the fact that infection, present or potential, may help to indicate the delivery by this method, and, under the technique of this procedure, he does not mention the desirability of cutting the posterior as well as the anterior lip of the cervix and low uterine segment in delivering larger babies. The discussion of appendicitis fails to take into account the displacement of the appendix upward by the pregnant uterus in the later months, which we feel is an important point to be considered. The repair of the third degree tear, as discussed by the author, is somewhat different from the technique advised in other clinics of this country. Usually, American surgeons use his technique in closing the mucosa and sphincter and then use a figure 8 silkworm-gut to close levators and urogenital septum and skin over the rectum. They also put the patient on a liquid diet and give opium to prevent bowel movement occurring for 10 days after such repair, as they believe it reduces the incidence of rectovaginal fistula.

The paper binding of the book is not suitable and will rapidly disintegrate with much using. It is useful to read the author's point of view on these subjects.

Physical Medicine and Rehabilitation for the Clinician. Edited by Frank H. Krusen, M.D. Cloth. $6.50. Pp. 371, with 96 illustrations. W. B. Saunders Company, 218 W. Washington Sq., Philadelphia 5; 7 Grape St., Shaftesbury Ave., London, W.C.2, 1951.

The editor of this textbook has combined in its 39 chapters articles by himself and 24 other contributors. It is indicated in the preface that the book was "designed especially to acquaint the average clinician with all the phases of this rapidly developing new special branch of medicine which would be useful to him in practice." It accomplishes the purpose for which it was designed in an excellent manner. This book will not only be of interest to the average clinician but will be of special benefit to the physiatrist, because it presents discussion of the latest developments in the field of physical medicine and rehabilitation.

The first section, entitled "Therapeutic Application of Physical Agents and Procedures," contains chapters on prescription writing in physical medicine, uses of heat, massage, basic principles used in therapeutic exercise, factors involved in posture, training the patient to rest and relax, and occupational therapy. This first section also contains excellent chapters on ultrasonic and experimental studies in microwave diathermy. The chapter on ultrasonics does not advocate the therapeutic use of ultrasound. It does point out some of the basic problems concerned with the use of this agent and thus briefly advises the reader of its hazards and potential usefulness. The second section, entitled "Diagnostic Applications of Physical Agents and Procedures," contains four chapters, which present electrodiagnostic methods, muscle testing procedures, skin resistance testing in neurological diagnosis, and measurements of the skin temperatures in health and disease. A third section devotes a number of chapters to subjects such as physical medicine and rehabilitation in a general hospital, function of the medical social worker, physical medicine in relation to neurology, arthritis, psychosomatic problems, orthopedic problems, poliomyelitis, and cerebral palsy. A final section, entitled "Fundamentals of Anatomy, Therapeutic Exercise and Physiology as Related to Physical Medicine and Rehabilitation," presents valuable material on the anatomy of the limbs and trunk, as well as physiology and the physiological effects of rest and immobilization.

Although the chapters are not extensive reviews of the various subjects that they cover, they do present basic useful information. The text is well illustrated, and the format is attractive.

Physical Medicine and Rehabilitation for the Aged. By Walter S. McClellan, M.D., Medical Director, Saratoga Spa, Saratoga Springs, New York. Publication number 105, American Lecture Series, monograph in American Lectures in Physical Medicine. Edited by W. A. Selle, Ph.D., Professor of Biophysics, University of California Medical Department, Los Angeles. Cloth. $2. Pp. 81, with 9 illustrations. Charles C Thomas, Publisher, 301-327 E. Lawrence Ave., Springfield, Ill.; Blackwell Scientific Publications, Ltd., 49 Broad St., Oxford, England; Ryerson Press, 299 Queen St., W., Toronto, 2B, 1951.

As the field of physical medicine and rehabilitation grows, there is an increased need for books that discuss its applications in the various fields of medicine. This monograph relates clearly, yet briefly, the usefulness of physical medicine and rehabilitation in the field of geriatrics. A two page chapter outlines the physiological changes in the aged that influence response to treatment. The next chapter briefly describes therapeutic physical agents, such as water, electricity, radiant energy, and mechanical force. It is unfortunate that, in the latter portion of this chapter, reference is made to the Zander apparatus, which has little therapeutic value for the younger patient and might result in frightening consequences if used on the aged. The chapter on application of physical medicine in specific medical conditions, describes the treatment of various forms of arthritis and related disorders in general terms. A section on spa therapy is included, with special reference to its advantages for patients with cardiovascular ailments. The purpose of this book is to summarize physical medicine and rehabilitation as it is related to the treatment of the aged, in a manner that would be interesting to the busy physician.

Social Medicine. By E. H. Cluver, K.St.J., E.D., M.D., Director, South African Institute for Medical Research, Johannesburg. Cloth. £3 5s. Pp. 862. Central News Agency, Ltd., Corner Rissik & Commissioner Sts., Johannesburg, S. Africa, 1951.

This textbook was written to fill a need for a separate work dealing with the influence of social factors on human health. The various parts of the book are written by South Africans who have special knowledge of the field under consideration. It deals extensively with all aspects of social medicine; these are causes of human disorganization, personal disorganization, social diseases, social disorganization, statistics, and medicosocial legislation.

The legislation and institutions in South Africa that deal with sociomedical problems are discussed in detail. A large portion of the book is directed to local South African problems; it is, therefore, of limited interest to American readers. Its broad scope and authentic content recommend it to the physician who is especially interested in social medicine.

QUERIES AND MINOR NOTES

EXPLANATION OF Rh, rh, Hr, AND hr

TO THE EDITOR:—*Please explain the use of Rh, rh, Hr, and hr. In the English classification, I noticed that capitalized letters are also used. I understand the rhesus factor in blood but would like a simple explanation of the terminology.*

M. T. Bolotin, M.D., Los Angeles.

ANSWER.—The serology and genetics of the Rh-Hr types are complex, and, inasmuch as terminology is merely a convenient means of presenting the facts regarding a subject, the nomenclature of Rh-Hr types is necessarily involved. The Rh-Hr types constitute a blood group system independent of the classic A-B-O groups and the M-N types. The blood factors of the system belong to two main categories, designated as the Rh and Hr factors. The Rh factors are of three principal varieties, designated as Rh_o, rh′, and rh″, respectively. The Hr factors are related to the Rh factors serologically and genetically in the same way that the blood factor N is related to blood factor M. Of the three theoretically possible Hr factors, however, only two are really known to exist, namely, hr′ and hr″. The symbol Rh_o is written with a capital "R," while the other symbols have a small initial letter. The reason for this is that Rh_o has a special position because it is the most antigenic factor in this system and is therefore the one usually at the basis of the clinical complications of hemolytic transfusion reactions and erythroblastosis fetalis. Factor Rh_o also corresponds to the original rhesus factor discovered with the aid of immune serums prepared by injecting rhesus blood into experimental animals. At present, antiserums of human origin exclusively are used for Rh examinations because of their higher avidity and titer; besides, antiserums of specificities other than anti-Rh_o are obtainable only from human sources.

By testing blood with the most important serum anti-Rh_o alone, persons can be classified as Rh-positive or Rh-negative. (When the terms "Rh-positive" and "Rh-negative" are used without qualification what is really intended is "Rh_o-positive" and "Rh_o-negative," respectively.) This subdivision is adequate for most clinical purposes. When examining blood donors, however, it is desirable to carry out tests with serums anti-rh′ and anti-rh″, and only those donors with cells lacking all three Rh factors should be used for Rh-negative recipients. Such persons are designated as type rh (or triple Rh negative) to distinguish them from Rh-negative persons who have been tested for the Rh_o factor alone. With the aid of the three Rh antiserums, eight types of blood can be distinguished, namely, rh, rh′, rh″, rh_y (or rh′rh″), Rh_o, Rh_1 (or Rh'_o), Rh_2 (or Rh''_o), and Rh_z (or Rh_1Rh_2). The first four types are Rh negative, and the absence of the Rh_o factor is indicated by the small "r" in the symbol. The latter four types are Rh positive as indicated by the capital initial "R".

In heredity studies, it has been found that the factors Rh_o and rh′, when they occur together in a person, tend to remain together in his children, and the same is true of factors Rh_o and rh″. Thus, in general, the blood factors Rh_o and rh′ are not parts of separate agglutinogens but of the same agglutinogen molecule. That is the reason for designating the antigenic complex Rh_orh′ by the short symbol Rh_1 (or Rh'_o), namely, to indicate that this is a single substance inherited as a unit; however, factor Rh_o and rh′ do occur occasionally in separate agglutinogens, and, in fact, among Negroids blood of type Rh_o (that is, blood containing factor Rh_o, but not rh′ or rh″) is the most common Rh-Hr type. To account for the hereditary transmission of the eight Rh types, it is necessary to postulate a series of at least eight allelic genes, namely, r, r', r'', r^y, R^o, R^1, R^2, and R^z, each determining a corresponding agglutinogen, rh, rh′ rh″, rh_y, Rh_o, Rh_1, Rh_2, and Rh_z, respectively. The symbols used for genes and agglutinogens are distinctive, in that italics are used for the genes and the letter "h" is omitted; moreover, superscripts are used to qualify gene symbols and not subscripts, in order to conform with the practice of American geneticists. It will be recalled that the Rh and Hr factors are reciprocally related. Therefore, whenever an agglutinogen lacks an Rh factor it possesses the corresponding Hr factor; for example, agglutinogens rh and Rh_o have both Hr factors, hr′ and hr″; agglutinogens rh′ and Rh_1 have the hr″ factor but not hr′; agglutinogens rh″ and Rh_2 have factor hr′ but not factor hr″, while agglutinogens rh_y and Rh_z have no Hr factors.

Every person inherits one Rh gene from each of his parents, and the resulting pair of genes represent his Rh genotype. When examining a person's blood, therefore, we do not test for the product of a single gene but of a pair of genes. The effect of each individual gene is deduced by comparing the reactions of blood cells from different persons of selected genotypes. When tests are carried out with all five reagents, anti-Rh_o, -rh′, -rh″, -hr′, and -hr″, the situation becomes quite complex, because as many as 18 phenotypes are then recognizable corresponding to the 36 theoretically possible genotypes.

TABLE 1.—*Comparison of International and British Nomenclatures for the Rh-Hr Types*

Partial list of symbols *			
International Nomenclature	British Notations	International Nomenclature	British Notations
Blood Factors		Antiserums	
Rh_o	D	Anti-Rh_o	Anti-D
rh′	C	Anti-rh′	Anti-C
rh″	E	Anti-rh″	Anti-E
hr′	e	Anti-hr′	Anti-e
hr″	e	Anti-hr″	Anti-e
Genes	"Chromosomes"	Agglutinogens	Agglutinogen Complexes
r	cde	rh	cde
r'	Cde	rh′	Cde
r''	cdE	rh″	cdE
r^y	CdE	rh_y	CdE
R^o	cDe	Rh_o	cDe
R^1	CDe	Rh_1	CDe
R^2	cDE	Rh_2	cDE
R^z	CDE	Rh_z	CDE
Genotypes		Phenotypes	
rr	cde/cde	rh	See table 2
$r'r$	Cde/cde	rh′rh	
$r'r'$	Cde/Cde	rh′rh′	
R^or	cDe/cde	Rh_o	
R^oR^o	cDe/cDe		
$I.^1r$	CDe/cde	Rh_1rh	
R^1R^o	CDe/cDe		
R^or'	cDe/Cde		
etc.	etc.	etc.	

* List does not include the Rh variants.

Instead of postulating a series of multiple allelic genes determining corresponding complex agglutinogens, one might imagine that each of the blood factors, Rh_o, rh′, and rh″, is inherited by a separate pair of genes and that these gene pairs are either in separate chromosomes or are linked within the same chromosome. In either event as a result of independent assortment or crossing-over, at equilibrium the distributions in the general population of the factors Rh_o, rh′, and rh″ would become independent of one another. That is, the frequency of blood factor rh′ should be the same among Rh_o-positive persons as among Rh_o-negative persons; however, factor rh′ occurs almost invariably in association with Rh_o and only rarely without Rh_o, and the same is true of factor rh″. This refutes the concept of separate gene pairs. Though the concept of separate gene pairs was disproved early in the history of the Rh-Hr types, it was later revived by the British investigators, who made it the basis of a different method of designating the Rh-Hr factors. This was indeed an unfortunate development. The British sym-

The answers here published have been prepared by competent authorities. They do not, however, represent the opinions of any official bodies unless specifically stated in the reply. Anonymous communications and queries on postal cards cannot be answered. Every letter must contain the writer's name and address, but these will be omitted on request.

bols are not only based on incorrect genetic and serologic concepts but have led to an unnecessary and confusing duplication of nomenclature. Many articles have been written using the British notations, and a partial table of equivalents is given in table 1.

While the British C-D-E notations may appear easier to understand, this simplicity is deceptive and is based on a misconception. Actually these notations are misleading and are not at all informative. They merely state that there are three Rh factors and incorrectly imply that tests are being done routinely also for three corresponding Hr factors, whereas there is no antiserum available to test for the so-called little d (Hr_o) factor. Moreover, they do not show the special position of factor Rh_o, and there is nothing to indicate which types are Rh_o-positive and which are Rh_o-negative. While the symbols for the elementary blood factors are simple, the nomenclature becomes impossible to use when dealing with agglutinogens and phenotypes as is necessary in Rh-Hr typing. Thus the British workers have been compelled to use so-called shorthand symbols, which are merely minor variations of the international Rh-Hr nomenclature, and thus adopt the incongruous position of arguing that two nomenclatures are simpler to use than one. The C-D-E symbols are impossible to use orally, and no provision is made for phenotype designations with these symbols. Consequently, as an equivalent for the international symbol for phenotype Rh_1rh, for example, C-D-E workers have used as many as 20 or more cumbersome variations in their publications, of which a partial list is given in table 2.

TABLE 2.—*Comparison of International and British Symbols for Phenotypes*

International Rh-Hr Nomenclature	Corresponding British Notations	
	Designations	Comments
1. Rh_1rh	1. None	Space for phenotype designation is left blank in British tables
	2. +++— or ++—+ or C+D+E—e+, etc.	The symbols represent the reaction with the four most frequently used antisera, in various orders
	3. CeDee or CeDe or CcD	These designations were proposed in 1949 but have not been widely adopted
	4. $\frac{CDe}{cde}$, CDe/cde, or CDEcde	This is the most likely genotype
	5. CDe/cde CDe/eDe Cde/cDe	All possible genotypes are bracketed together
	6. CDe/cde (R_1r) or CDe/cde (Rh_1rh)	This is the most likely genotype together with "shorthand" or Rh-Hr designation for clarity
	7. R_1r R_1R_o R_or'	All possible genotypes are expressed in "shorthand" symbols and bracketed together
	8. R_1r	This is the "shorthand" symbol alone
	9. CDe/c, $\frac{CDe}{ce}$, CDece, etc.	Symbols d and e are omitted, in order to indicate that blood was not tested with anti-e (hr") serum or hypothetical anti-d (Hr_o)
	10. DCe/dce	This is the most likely genotype with symbols arranged to correspond with postulated arrangement of the "genes" in the chromosome
	11. CD heterozygous	For oral use

Everyone agrees that eventually there will be only a single nomenclature for the Rh-Hr types, just as in the case of the A-B-O groups and M-N types. As soon as it is generally appreciated that the C-D-E notations, like the Moss-Jansky numberings for the A-B-O groups, serve merely to conceal ignorance and that the use of these notations discourages all desire to acquire a fundamental understanding of the subject, editors will insist on the exclusive use of the international Rh-Hr nomenclature in articles published in their journals. Such a step would do much to further a more widespread understanding of the subject and progress in the field.

To simplify the present discussion, no mention has been made here of the Rh variants. Those wishing to acquire a full understanding of the subject are urged particularly to study the excellent articles that have been published recently on blood groups in cattle and chickens by Stormont and Briles.

INVOLUTIONAL PSYCHOSIS AFTER OVARIECTOMY

TO THE EDITOR:—*A woman, 43, had an ovariectomy two months ago, and now, she wants to have her ovaries transplanted in order to restore her functions. She has three children; the youngest is 4 years old. The second child needed transfusions at birth for erythroblastosis, but the third child was normal at birth. The woman complains of "fear she will lose her mind," and "wants her ovaries put back in." She has been extremely depressed and looks somewhat myxedematous and dull. The surgeon gave her estrogens (premarin®), and 1 grain (0.06 gm.) of thyroid extract daily. Her blood pressure is 124/80, and her pulse rate is 80. There have been symptoms of palpitation, insomnia, melancholia, and pruritus vaginae. Pelvic examination reveals that the fundus uteri is missing, but part of the cervix remains. In my opinion, if the cervical remnant could be stimulated to menstruate this patient would benefit psychologically. If pellet implantation is of value, it too might be efficacious from the same standpoint. This patient's condition is suggestive of prepsychotic symptoms, and I would welcome suggestions regarding implantation of ovarian hormone pellets.* *M.D., California.*

ANSWER.—A fair conclusion from the submitted data is that this woman is suffering from a mild psychosis, possibly of the so-called involutional type and that her symptoms are not simply menopausal. She obviously has wrong ideas as to possibly losing her mind because her ovaries were removed and of the desirability of "wanting her ovaries put back in." Unless she is actually psychotic, it would seem that a physician could readily set her straight on such questions. No mention is made of vasomotor symptoms, so that there is no indication for estrogen therapy, especially as the symptoms that she shows appear to be psychogenic and not menopausal. Heterotransplantation of the ovaries is not successful, and it is not a recognized operation. Pellet implantation is not indicated and certainly would offer no advantage over the far more flexible plan of oral estrogen therapy, even if this were indicated. This woman is in greater need of psychiatric than hormone therapy.

ALLERGY AND RESPIRATORY TRACT INFECTIONS

TO THE EDITOR:—*In the middle of August, 1951, intense itching of the nose, roof of the mouth, and eyes, followed by watery nasal discharge and violent sneezing developed in a 29-year-old man. This condition was diagnosed as "hay fever due to ragweed pollen." There is no personal or family history of allergy; however, this was his first summer in this country. The antihistamines did not seem to help, and he was treated with pollen extract injections throughout the season without success. The cardinal symptoms disappeared with the onset of cooler weather at the end of September; however, an itching sensation of the roof of the mouth persisted, and one nostril was often obstructed. He has noted an increased susceptibility to colds and upper respiratory infections. Should he be treated with pollen extract throughout the year?*

M.D., New York.

ANSWER.—A first season's hay fever extending into nonseasonal symptoms almost always means the presence of additional allergy. It is assumed that the patient was actually found allergic to ragweed by test. The nonseasonal symptoms speak for an allergy, possibly to dust, feathers, or another inhalant. The allergic condition may decrease the resistance of the respiratory tract to infection; however, the question of the presence of infection here should be definitely established. If the spells come frequently and last a short time, or if there are many eosinophils in the nasal and bronchial secretions, and if the infection is not transmitted to other members of the family, the chances are they are not infectious in nature. At times, in long-established and severe seasonal hay fever, respiratory symptoms may occur in the winter, without being traceable to new allergies. They are produced by irritating influences, such as cold air, dry air, and exertion. In such cases, successful treatment for the seasonal hay fever may prevent these winter symptoms. Treatment with pollen extract at the present time will have no influence on the symptoms this winter. A complete allergic check-up is advisable, with future treatment based on the results of the findings.

"AIR DENT" METHOD OF GRINDING TEETH

To the Editor:—*I have had some patients who worked in dental offices, in which "air dent" methods of grinding teeth (applying abrasives with air pressure) have been used. These patients had respiratory infections, and they were concerned about the possibility of inhaling substances from air syringes. Is there any occupational hazard connected with the use of these syringes?*

Mavis P. Kelsey, M.D., Houston, Texas.

Answer.—This question centers about the exposures for the dental operator; however, the reply must concern the patient as well. In this innovation, the abrasive applied represents a mixture of aluminum oxide and dolomite, which is calcium carbonate. In practice, the size is from 10 to 50 μ. About 30 gm. are involved in the average excavation. This is thrust on the tooth area under air pressure of 80 to 90 lb. The process is dry, and exhaust apparatus is required to remove the dusty fines. At times a local anesthetic is required as is usual for all such excavation methods. The operator is thus exposed to the damaging properties of local anesthetics. The method is such that no severe damage is imposed on soft tissues, but some particle imbedment into the mucosa takes place, with spontaneous extrusion in about 24 hours. There is a possibility that the operator may be exposed, more than with other methods, to flying infective material surrounding dust particles. Although neither aluminum oxide or dolomite (an alkali) is rated as conducive to substantial pulmonary injury, a theoretical risk is involved. Much depends on the ability of the operator to successfully make use of the exhaust appliance. Cold associated with compressed air is said not to be detrimental. It is, perhaps, too early to make a definite statement concerning this problem. Extensive investigations on undesirable agents are now under way. The air dent method, however efficacious, is not receiving wide application, owing to the high cost of the equipment.

VIRAL DYSENTERY

To the Editor:—*A form of intestinal disturbance popularly called Saint Lawrence fever is prevalent in the Great Lakes basin and adjoining areas. Some doctors think that the term Saint Lawrence fever is merely a euphemism for various forms of food poisoning, because, when flies are eliminated and sanitation is improved, the incidence of the disease drops remarkably. Other doctors blame the water, paratyphoid and various organisms. Some health officials say the cause of Saint Lawrence fever is unknown. What is your opinion?*

Robert P. Little, M.D., Quebec, Canada.

Answer.—There is reason to believe that the intestinal disturbance in question is a malady to which many other names are given; some of the names are epidemic nausea, vomiting and diarrhea, gyppy tummy, trots, water disease, winter disease, summer disease, Hannover disease, Spencer's disease, and Reimann's disease, depending on the symptoms, when or where it occurs, and who describes it. The best general term is viral dysentery. Although a virus has not been identified, epidemiological, clinical, and experimental evidence point to one or more filtrable agents as the cause. The disease was transmitted to volunteers by the inhalation or ingestion of filtrates of diarrheal feces from patients. The disease is widely epidemic and even pandemic, especially in the late summer or autumn; epidemics last a month or more and, at times, account for more intestinal disturbances in this part of the world than any other enteric infection. Epidemiologically, viral dysentery resembles the common cold, and it is chiefly noted when households, schools, barracks, and other closed communities are affected. Because the symptoms are usually mild and brief, epidemics may escape detection. A common supply of food or water, though usually suspected, is not the source of the disease, and enteric bacteria play no role. Since the mode of transmission seems to be by contact or by the airborne route, the usual sanitary measures, although important under any circumstances, do not affect the incidence rate of viral dysentery. Therapy is seldom necessary and antibiotics should not be given. Bed rest is desirable, and parenteral infusion may be needed for the replacement of fluid lost by vomiting and diarrhea.

TRANSFUSION REACTION

To the Editor:—*A transfusion reaction occurred after the administration of 500 cc. of group O, Rh negative, banked blood to a group O, Rh negative recipient. The crossmatch was compatible at room temperature, 37.5 C, and at 4 C. The transfusion reaction was of the hemolytic type with hemoglobinuria, anuria for 48 to 72 hours, and complete recovery in a week. A postreaction check showed the transfused blood to be compatible with that of the patient in every respect. The patient was suffering from marked anemia and intestinal obstruction, as a result of an Ascaris lumbricoides block. The transfusion was administered simultaneously with a 5% solution of glucose in distilled water through different intravenous routes. An administration of 1,000 cc. of 5% solution of glucose in distilled water followed the transfusion. Is there danger of a hemolytic reaction in giving 5% or 10% solutions of glucose in distilled water through the same tubing that has been previously used for the administration of blood? Is there danger of a hemolytic reaction occurring from the use of a 5% or 10% solution of glucose in distilled water when given simultaneously with blood, although given by different intravenous routes? Is there any danger of a hemolytic reaction occurring when a transfusion is preceded or followed by a 5% to 10% solution of glucose in distilled water? If so, what is a safe time interval, and what precautions should be taken to prevent such reactions?*

M.D., Maryland.

Answer.—This consultant does not know of a case in which a transfusion reaction such as you describe was proved to result from intravascular mixing of a properly prepared 5% glucose solution and properly administered blood of normal osmotic fragility; however, hemolytic transfusion reactions have resulted from the entrance of distilled water into the circulatory system prior to blood transfusion. Moreover, it has been emphasized that 10% glucose and even 5% glucose are not isosmotic with stored blood, particularly when the blood is at a lower temperature than the glucose solution. Therefore, when large amounts of 5% or 10% glucose are mixed with banked blood, hemolysis sufficient to cause hemolytic transfusion reactions may occur. For this reason, large amounts of glucose solution at room temperature should not be permitted to mix with cold banked blood. If transfusions are started with glucose, care must be taken to prevent the glucose solution from backing up into the blood.

The use of Coombs' serum and trypsinated red cells in incompatibility tests and the employment of a simple test for osmotic fragility are newer techniques that may be helpful in explaining or preventing hemolytic transfusion reactions.

VISUAL REQUIREMENTS FOR DRIVERS

To the Editor:—*I received the following letter from the Driver Improvement Bureau of the Motor Vehicle Department of this state: "Your State of Delaware is endeavoring to lower the motor vehicle accident rate by attacking the problem from every possible point of view. One important phase of the investigation is concentrating on the visual fitness of the drivers licensed by this state. It is thought that the present visual requirements and testing should be revised. We would appreciate learning your views based on your specialized training in the field of ophthalmology. Please fill out the enclosed questionnaire and return at your earliest convenience." I am requesting your assistance in answering this letter.*

M.D., Delaware.

Answer.—Unfortunately, there are no authoritative standards for amount and quality of vision needed for safe driving. Indeed, there is no agreement on which functions of vision should be tested. Lebensohn (*Am. J. Ophth.* **32**:592, 1949) points out that the macular vision of the accident-prone driver does not differ from that of the ordinary driver. Deficiencies in dark adaptation, field of vision, and eye-hand and eye-foot coordination are more significant than central visual acuity. No state, as yet, tests drivers for night vision or glare resistance, although these factors are as important as central vision. Only three states require reexamination for renewal of licenses. Obviously, frequency of examination is paramount to the continued maintenance of adequate standards.

The greatest current need is for a screening test that can be performed rapidly, with relatively simple and inexpensive apparatus that can be operated by personnel with limited training. State requirements for motor vehicle drivers are published annually by the American Optical Company. The National Safety Council and the American Association of Motor Vehicle Administration have devoted considerable attention to this problem.

TREATMENT OF PSORIASIS

To the Editor:—*What is the rationale for the administration of "granulestin" (purified, granulated soyaphosphatides [80%] with added vegetable stabilizer) in the treatment of psoriasis, and what results can be expected in an acute generalized flare-up in a girl, 15 years old? Are there any possible ill effects from prolonged therapy? What is the experience with corticotropin gel, and is there much danger of a more serious flare-up after cessation of therapy?* *M.D., Maryland.*

Answer.—There is reason to believe that abnormal lipid metabolism is a factor in the production of psoriasis. Therein lies the rationale for the administration of granulestin. Many dermatologists think that the results of such treatment fall far short of expectation, particularly in the treatment of acute psoriasis. It would be well, if treatment is to be administered for any length of time, to examine the blood serum for any changes or abnormalities of the lipid fractions. There has not yet been sufficient experience with corticotropin gel to determine its efficacy in psoriasis. In general, it is safer to avoid the use of steroid hormones and corticotropin for psoriasis and to employ them for a short period only when so-called desperation measures are necessary, as for psoriatic cripples or for generalized psoriatic exfoliative dermatitis.

EXCESSIVE SENSE OF SMELL

To the Editor:—*Is there a clinical entity characterized by an excessive development of the sense of smell? I have a patient whose sense of smell is so strong that it makes her uncomfortable.* *Vincent Ippolito, M.D., New York.*

Answer.—Excessive and disagreeable perception of odors may be due to a number of causes; the most prominent are organic brain changes, suppuration in the accessory nasal sinuses, and hysteria. Neurological investigation is necessary to rule out hyperosmia resulting from tumors of the temporal lobe, disagreeable odors which are a part of epileptic aurae, and those encountered in the crises of tabes. Psychiatric examination would indicate the presence of hysteria and schizophrenia as causes of functional hyperosmia. Suppurative sphenoiditis may present many diagnostic difficulties. Neither x-ray examination nor examination of the nose itself may be adequate means for making an immediate diagnosis. Frequent examinations for detection of the telltale streak of pus in the region of the sphenoid ostium usually are necessary. At times, when sounding of the sinus is not otherwise possible, it may be necessary to make a diagnostic irrigation of the sinus by surgical means.

TOLERANCE TO MORPHINE

To the Editor:—*I have read that some morphine addicts take 40 grains (2.59 gm.) a week or about 6 grains (0.39 gm.) a day. A woman told me that she used 60 grains (3.88 gm.) a week. How is this possible when 0.25 grain (15 mg.) is a safe dose and 0.50 grain (30 mg.) is not without danger. The latter dose is frequently used for coronary attacks. What would constitute dangerous hypodermic and intravenous doses?*

M.D., New Jersey.

Answer.—A characteristic phenomenon associated with addiction to morphine or similar drugs is the development of tolerance, which is defined as the diminishing effect of the same dose of a drug, with repeated doses. During addiction to morphine, tolerance may become so highly developed that the only factors limiting the amount of morphine the addict can consume are the available supply and the difficulties inherent in injecting large quantities of solution either intravenously or subcutaneously. As much as 5 gm. (78 grains) of morphine sulfate have been injected intravenously under closely controlled conditions and over a period of 16 hours, into tolerant addicts without untoward toxic effects. The mechanisms of tolerance are unknown, but the phenomenon has been attributed to the enhancement of homeostatic mechanisms that oppose the actions of morphine. Increased destruction of morphine may also play a role. In a nontolerant, nonaddicted adult, a dose of morphine sulfate larger than 15 mg. (0.25 grain) is regarded as dangerous, whether administered subcutaneously or intravenously. Since no reliance can be placed on the statements of addicts regarding the amount of drugs they consume, a safe dose for an addict can be determined only by careful observation of the patient under special institutional conditions. The procedure involves physical isolation of the addict in an environment that makes it impossible for him to obtain drugs other than those prescribed, careful observation for the development of signs of abstinence from morphine, and determination of the least quantity of morphine that will prevent the symptoms.

TREATMENT OF BURSITIS

To the Editor:—*In Queries and Minor Notes in* The Journal, *Aug. 25, 1951, you outline the conventional treatment for acute bursitis.*

During the past four years, my associates and I have been treating all patients with acute bursitis with procaine penicillin, and the results have been so successful that I would like to call your attention to this method of therapy. We have found no other reports in the literature of the use of this medication in bursitis. During the past four years, we have treated about 60 patients with acute subdeltoid bursitis, 3 with acute suprapatellar bursitis, 2 with achilles tendon bursitis or tenosynovitis, and 2 with trochanterian bursitis with procaine penicillin. In most of the acute cases of 4 to 10 days' duration, the results, after three or four intramuscular injections, were uniformly and dramatically successful. Recurrences have been rare in this group. In patients with cases of longer duration, five or six injections have been required, and recurrences have been somewhat more frequent. We have had good results regardless of whether the presence of calcium was indicated by x-ray examination. In a few instances irrigation was done prior to procaine penicillin therapy, and in two cases cultures made of the fluid were sterile.

This treatment is simple and has been so successful in the majority of cases that we prefer it to x-ray therapy, diathermy, or procaine hydrochloride irrigation. We have had no experience with cortisone. Just why penicillin should work, when infection has not been demonstrated, is not clear, but the treatment seems worthy of a wider trial.

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HIATUS HERNIA

To the Editor:—*In* The Journal, *Nov. 24, 1951, in Queries and Minor Notes, a California physician requests information on the treatment of diaphragmatic hernia. The answer to this question failed to note that this patient is described as having "some cardiospasm" and regurgitation associated with evidence of pulmonary involvement.*

It should be pointed out that a hiatal hernia is unlikely to account for esophageal obstruction sufficient to produce pulmonary complications, unless there is associated esophagitis and/or stricture. Neither surgical repair of the hiatal hernia nor phrenicectomy is likely to offer any hope of relief. If there is a true cardiospasm (achalasia of the cardia), dilatation with an expanding type of dilator is indicated. If there is esophagitis and/or stricture, dilatation by means of bougies and medical therapy directed toward neutralization of gastric acidity should be used.

This patient warrants more careful investigation of his esophagus by means of roentgen examination and esophagoscopy. From the information given in the query, one must conclude that therapy directed only to the hiatal hernia is unlikely to offer symptomatic relief.

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